

Action Agenda Funding Strategy Work Products

Puget Sound Partnership Action Agenda: Financing Strategy

I. New Innovative Funding Sources, December 2008

II. Estimates of Spending Related to Puget Sound, January 2009

Puget Sound Partnership

Action Agenda: Financing Strategy

New Innovative Funding Sources

FINAL REPORT

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**Jan Cassin
Parametrix, Inc.
411 108th Avenue, NE
Suite 1800
Bellevue, WA 98004**

**Adam Davis
Solano Partners, Inc.
Suite 313
San Rafael, CA 94901**

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EXECUTIVE SUMMARY

This report identifies new innovative funding sources to support Puget Sound recovery. This was done by studying examples of innovative programs that align financial incentives with environmental outcomes. The key lessons from those programs were then distilled with an eye to their application in the region. Categories of new funding sources evaluated include payments for ecosystem services and ecosystem service markets; innovative private sector incentives, taxes and fees, and voluntary private sector programs.

This report concludes that these market mechanisms and financial incentive programs can be used to effectively support the initial strategic priorities developed by the Puget Sound Partnership (Partnership). Because all of the programs discussed in this report reward measurable units of improvement, restoration, or protection, they help to focus attention on the basic question: What are we buying with the money we spend for Puget Sound recovery? The approach described here makes use of various tools—structural approaches that reward measurable improvement—to directly address root causes of the problems identified by the Action Agenda.

An enormously complex set of institutions and actors affect the health of the Sound, and a powerful organizing principle like ‘aligning environmental and economic incentives’ seems to be required to achieve recovery over the next 12 years. To accomplish this goal, the Partnership will need to leverage and harmonize a host of disparate financial incentive efforts now underway, including ‘Mitigation that Works’, county tradable development rights programs, low-impact development (LID) incentives, and grants for habitat protection and management. These programs can form the *building blocks* of a regional strategy, but not if they remain disparate, unrelated efforts.

Secondly, the Partnership will need to develop a mechanism for *cost-effective compliance* with a whole range of regulatory and incentive program requirements. This compliance mechanism will enable developers and businesses to buy what they need to conduct their affairs responsibly without having to ‘reinvent the wheel’ each time.

Finally, the Partnership will need to leverage the public sector investment in *structural solutions* for cost-effective compliance with a greater level of investment from the private sector, which generates a cost-effective supply of environmental improvements – for wetland offsets, natural resource damage claim settlements, conservation acquisitions, and water quality improvements.

A remarkable trend is emerging across the United States as significant sources of private capital—both institutional and individual investors—are investing money into pollution reduction as well as ecosystem services delivered through conservation and restoration on private land. A wide variety of market mechanisms and incentive programs enable reasonable risk-adjusted returns directly tied to environmental performance, and investors seeking returns are the source of new financing for a variety of public environmental benefits.

Sometimes referred to as ‘cap and trade’ mechanisms, the key feature of these programs is that they create a scientifically verifiable relationship between impacts and offsets. This makes impacts to critical environmental features cost more while *at the same time* making each unit of protection and restoration financially valuable. Essentially, these programs allow unavoidable impacts from development and business to ‘outsource’ compliance to third parties who are certified by government agencies because they are providing tangible results at a larger scale and more cost-effectively than local mitigation can.

Many of these programs are already in use in the Puget Sound region to some degree; they are all being used to provide more affordable environmental results in specific places around the country. The specific market-based and incentive programs discussed in detail in this report are:

- ❖ Water Quality Trading Programs
- ❖ Stormwater Flow Reduction Programs
- ❖ Tradable Development Rights
- ❖ Mitigation Banking
- ❖ Endangered Species and Biodiversity Banking
- ❖ Land-based Carbon Sequestration

All of these programs align measurable environmental performance with revenue and provide both incentive for investment *and* cost-effective compliance. The rapid growth of these new environmental markets represents an opportunity to leverage a significant national trend for Puget Sound protection and recovery. It is the development of clear *demand* for the ecosystem services created through restoration, conservation, and stewardship actions that will catalyze additional private investment at scale in the Puget Sound region. Significant private capital is looking for places to invest in supplying ecosystem services, but only in geographies where sufficiently clear demand justifies the risks involved in projects that must create measurable high-quality environmental results to be successful.

Alignment with Existing Programs

A key part of our assessment has been an analysis of how economic incentive and market programs developed in other parts of the country could work in the very specific political, cultural, and geographic world of the Puget Sound.

The following is a list of the specific programs that were researched and reviewed:

- Mitigation reform – the Mitigation that Works Forum led by Washington State Department of Ecology (Ecology)
- Conservation markets for rural lands (a pilot program of the Washington Conservation Commission)
- Western Climate Initiative (WCI) and Climate Action Team (CAT) – design of cap and trade and how offsets from carbon sequestration projects will be allowed
- State and local no net loss regulations/Growth Management Act and Shoreline Management Act (critical areas, shorelines, etc.)
- Existing programs for Natural Resources Damage Assessment (NRDA) and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) cleanup
- Salmon recovery plans (establish watershed priorities for salmon projects)
- National Pollutant Discharge Elimination System (NPDES) Phase II permits
- Current efforts to improve transfer of development rights (TDR) programs, including efforts to establish region-wide TDR programs

In addition, we have engaged in conversations with numerous related programs that, while not specifically focused now on financial incentive mechanisms, have the potential to engage productively with this type of effort. A representative, but not comprehensive, list of these initiatives includes:

- The Cascade Agenda of the Cascade Land Conservancy (CLC)
- The Shoreline Alliance of the Trust for Public Land, The Nature Conservancy, and People for Puget Sound
- The Quality Growth Alliance led by the Urban Land Institute
- The ongoing Conservation Markets Study lead by the Washington Conservation Commission funded by the 2008 legislature
- The Biodiversity Conservation Strategy of the Washington Biodiversity Council

The extraordinary resources developed and managed by these groups will play an important part of achieving Action Agenda priorities.

Core Recommendations

1) Priming the Pump for a Regional Ecosystem Marketplace

The single most important step the Puget Sound Partnership could take to advance new structural approaches for restoration is the creation of payments for services or integrated ecosystem markets. The initial stage would involve a procurement approach for specific environmental outcomes related to Action Agenda priorities – e.g., water quality and related land conservation goals. Using competitive bidding for price discovery, the Partnership can ‘jump start’ markets by targeting *public funding* to buy measurable quantities of:

- ❖ Riparian restoration
- ❖ Wetland restoration
- ❖ Shoreline restoration
- ❖ Point source pollution from publicly owned treatment works (POTWs)
- ❖ Non-point source pollution from septic systems, street and building runoff
- ❖ Development rights that reduce conversion of working forests and farms

The first step in developing a regional ecosystem marketplace is an initial round of purchasing ecological benefits through an Ecological Procurement Program and Registry. This procurement system should build on and incorporate existing programs—the regional TDR marketplace pilot, conservation markets on rural lands pilot, the Mitigation that Works Forum, and potentially an ‘in lieu fee’ program for aquatic resources mitigation, and the evolving carbon cap and trade program under the WCI. The initial procurement effort would generate a bank or group of ‘credits’ that reflect net benefit in terms of specified Action Agenda priorities. Next, the Partnership would facilitate the creation of a regional ecosystem marketplace in which credits could be purchased to mitigate unavoidable impacts of new development and/or purchased and retired for conservation. The sale of credits would *establish a revolving fund* in which new economic activity pays for the next round of projects to generate environmental benefits and credits for sale.

The key features of this recommendation and steps to implementation include the following:

Regional Procurement and Registry for Action Agenda Priorities

- Procurement of ecosystem services (or environmental benefits) is driven by Action Agenda priorities—for example, protecting high-quality estuary habitat, protecting and restoring ecological processes, restoring shoreline habitats, salmon recovery, addressing stormwater, and preventing water pollution at the source.
- Procurement would be driven by the use of a reverse auction, whereby the Partnership identifies and funds priority procurement projects through a competitive bidding process. The Partnership can specify the type, amount, quality (performance standards), and/or location of the environmental benefit needed. Bidders then compete to provide the specified benefit at the lowest cost to the Partnership. Bids can be submitted by local governments, Tribes, nongovernmental organizations (NGOs), or the private sector.
- The Partnership in effect serves as an aggregator to develop a ‘bank’ of credits in this initial step by securing the provision of a specified amount of environmental benefit related to habitat, species protection, water quality, or stormwater management.
- The registry serves to track the type, number, and location of credits that have been procured. The registry provides accountability for the benefits being procured and holds the credits for eventual release in a market.

Results

While the creation of cap-and-trade mechanisms that tie impacts to offsets will be critical for long-term success, the Partnership can create the perception and the reality that *measurable units of environmental improvement are financially valuable in the Puget Sound region*. Once this is understood by businesses and landowners, specific compensatory mitigation programs can be used to create demand for purchase of appropriate offset credits from the registry.

The creation of this Puget Sound Ecosystem Service Registry (ESR) will allow the Partnership to accomplish the tasks essential to recovering the health of the Sound in the context of continued rapid growth. The ESR will:

- ❖ Leverage and harmonize a host of disparate financial incentive efforts now underway.
- ❖ Provide a mechanism for *cost-effective compliance* with a range of regulatory and incentive program requirements.
- ❖ Serve as a source for cost-effective purchase of environmental improvement for any interested buyer, including government and philanthropic sources.

2) Expand Use of Green Taxes/Tax Incentives and Voluntary Private-Sector Programs

The Partnership has an opportunity to work with the Department of Revenue, the Department of Ecology, other state agencies, and local governments to develop a proposal for the use of a suite of green taxes, tax incentives, and fee-bates to be used at state and local levels to promote environmentally beneficial actions as well as provide funding for Action Agenda priorities. The initial list of potential taxes and tax incentives described here should be evaluated for legal issues, revenue potential, impacts on economic activity, equity impacts, and ability to provide local revenues to support state and local governments in implementing the Action Agenda. A focus of these strategies should be to enhance the capacity of local governments to gain supplemental sources of funding for meeting their responsibilities towards recovering Puget

Sound while also affect behaviors that encourage avoidance and minimization of impacts, promotes green infrastructure, and encourages conservation of resources.

Immediate Next Steps

Because full development of ecosystem service markets can take time, it is recommend that the Partnership initiate development of expanded incentives and markets in the following manner.

I. Expand incentives to the private sector; begin with expanding incentives for improving water quality and addressing stormwater management;

(a) Expand payments for water quality improvements related to nutrients, fecal coliform, sediment or temperature impairment in watersheds experiencing these problems, or likely to experience impairment in the near future.

The Partnership should work with a willing watershed or county to implement a coordinated system of payments for water quality improvements. These payments would provide incentives for private land owners or businesses to voluntarily implement non-point source reductions that lead to measurable water quality improvements.

(b) Provide more incentives to the private sector for improving stormwater management (water quality and water quantity issues).

The Partnership should work with a willing city, county, or stormwater district to develop and implement a model incentive program for stormwater. The first step would be to implement 1-2 pilots modeled on the successful City of Portland and King County incentives programs. Incentives are targeted to actions that produce improvements in stormwater source control or on-site treatment (e.g., LID, disconnection of downspouts, green streets). Incentives would be in the form of either direct payments, or pricing mechanisms such as tiered rate structures combined with fee-bates or discounts for specified actions.

Based on the outcomes of the initial pilots, the Partnership should work with regional stakeholders to require implementation of an incentives-based fee structure for stormwater management throughout the Puget Sound Region.

II. Develop and implement ecosystem service markets to redirect existing and new spending toward more environmentally beneficial and cost-effective compliance and mitigation projects that also fulfill Action Agenda priorities;

- Implement the in-lieu-fee mitigation program in several pilot watersheds.
- Evaluate the feasibility of water quality crediting and trading.
- Implement pilot cap and trade programs for removal of impervious surface and removal of shoreline armoring.

Initial implementation steps for these programs involve the development of: the trading platform and policies; crediting protocols; project implementation strategies; creation of an initial bank or pool of credits; and implementation of trading.

(a) Implement the in-lieu-fee mitigation program in several pilot watersheds.

The Partnership should coordinate development of the in-lieu-fee mitigation program and cap and trade pilots. This would allow the creation, testing, and refinement of an umbrella banking or trading platform and institution with consistent standards for the region, to achieve better environmental results at lower cost. This structure can then be expanded to include markets for additional resources linked to Action Agenda priorities.

(b) Evaluate the feasibility of water quality crediting and trading.

The Partnership should work with Ecology to determine the necessary components of a water quality trading program, develop a framework for defining credits, complete the evaluation of existing programs in other states to determine conditions for success, and develop a draft water quality trading model framework.

The Partnership or Ecology should then work with a willing county or watershed to initiate a pilot project, which would invest in projects that generate water quality credits for purchase, similar to the in-lieu-fee mitigation program.

(b) Implement pilot cap and trade programs for removal of impervious surface and removal of shoreline armoring.

The Partnership should work with Ecology and willing county or watershed groups to implement two pilots – one for shoreline armoring, and one for impervious surface. An initial focus on markets that reward removal of impervious surface and shoreline armoring will address two of the critical threats to Puget Sound health identified by the Action Agenda. These first pilots could be established in the near term, based largely on existing regulations and/or local watershed and land use planning efforts.

Depending on how well the pilots function, similar cap and trade approaches would be developed in the future to provide cost-effective approaches for addressing other Action Agenda priorities, such as removal of overwater structures, derelict creosote pilings, structures in floodplains, or restoration of threatened habitats.

Summary

This report provides detailed information on existing programs from around the country that have successfully aligned economic incentives with environmental outcomes. There have been false starts and mistakes, but the key object lessons and design features from a range of programs are increasingly clear, as is the enormous opportunity we now have to balance built and natural infrastructure, economy, and ecology. The fundamental driver of these programs is the value of nature—the financial value of natural systems that provide water quality, healthy populations of plants and animals, local food and timber, increased appraisal of adjacent real estate, and even climate stability. The laws of supply and demand are now taking effect because cumulative impacts on natural systems have reached the point where such systems are increasingly scarce, and therefore increasingly valuable.

While early programs and approaches have aligned financial incentives with various types of environmental benefit, for the Puget Sound region *water* is the place to start. Creating price signals for each measurable unit of protection, improvement, and stewardship of water quality can harness the tremendous power and energy of the Puget Sound economy in the service of its

own long-term benefit: a path down which environmental quality and quality of life can go hand in hand.

Acronyms

BMP	Best Management Practice
CRP	Conservation Reserve Program
CWA	Clean Water Act
DOT	Department of Transportation
EEP	Environmental Enhancement Program
EQIP	Environmental Quality Incentives Program
ESA	Endangered Species Act
GHG	Greenhouse Gases
HCP	Habitat Conservation Plan
LID	Low-impact Development
NGO	Non-governmental Organization
PES	Payments for Ecosystem Services
TDR	Tradeable (or Transferable) Development Rights
TMDL	Total Maximum Daily Load
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
WHIP	Wildlife Habitat Incentives Program
WRP	Wetland Reserve Program

I Introduction

The purpose of this report is to identify new innovative funding sources to support implementation of the Action Agenda, and ultimately, Puget Sound recovery. It supports development of a comprehensive financing strategy as required under RCW 90.71.370, to **“Identify methods to secure stable and sufficient funding to meet these needs as well as proposals for new sources of funding to be dedicated to Puget Sound protection and recovery”**.

New funding could come from expanded use of traditional funding sources, such as state and local taxes and fees, or additional federal appropriations. However, because of the magnitude of conservation, remediation, and restoration needed to achieve a healthy Puget Sound, traditional public funding sources alone are unlikely to be sufficient. New funding sources that can engage incentives and significant levels of private-sector investment in Puget Sound recovery will also be needed. In addition, because economic activity contributes to many of the factors that are degrading the region’s environment, harnessing economic activity to pay for Puget Sound recovery is necessary to ensure that inevitable impacts from economic development do not outpace our ability to pay for needed environmental improvements.

Approach

The following steps were used to identify new innovative funding sources:

1. Using a combination of literature review and interviews, existing regional, national, and international programs and tools were identified that could serve as models of new funding sources for the Action Agenda.
2. Programs were evaluated for the potential to provide new funding, lessons learned, conditions contributing to successful programs, feasibility in Washington State, and benefits in terms of Action Agenda priorities.
3. Based on the review and evaluation, recommendations were developed for which new funding sources could best be applied to Action Agenda implementation.

I.1 Types of New Funding Sources Covered in this Report

This report discusses three types of new funding sources: payments for ecosystem services and markets; ‘innovative traditional’ tax and incentive programs, and voluntary private sector programs. Innovative traditional and incentive programs have a longer history and are more widely used, both in this region and elsewhere, than environmental markets. This report focuses most heavily on markets, as these represent funding sources that have significant potential for improving environmental outcomes, and have so far not been extensively tapped in Washington State.

The funding sources discussed here are not mutually exclusive, and within each category, numerous financing tools and approaches are available. A solid funding strategy will incorporate a dynamic mix of these sources and tools. Our survey will focus on identifying and evaluating the most common tools within each general funding strategy that are likely to provide good models for Action Agenda funding.

The programs and tools described in this report will provide new funding sources in a number of different ways:

- More cost-effective allocation of existing funding sources means that existing money goes further.

- New investment can be brought into the region—private-sector investment in compliance, mitigation, and voluntary restoration increases the funding pool.
- Spin-off economic activity supported by incentives and market-based approaches can contribute to the tax base and provide additional local and state revenue—for example, green businesses, market support, or secondary businesses that arise from the existence of environmental markets (e.g., certifiers, verifiers, insurance, brokers).
- These programs provide dedicated funding that is spent directly on measurable environmental outcomes, either through dedicated green taxes and fees, and/or markets that directly reward environmental improvements.
- The incentives and markets programs discussed can avoid some of the constraints on economic activity associated with command and control regulation and higher taxes or fees.

1.1.1 Payments for Ecosystem Services and Markets

These programs can be used to direct new funding, and/or redirect existing funding, specifically toward the achievement of environmental performance goals. They use market approaches or mechanisms to account for both the cost of environmental damage and the financial value of environmental protection and/or improvements. Direct payments for the desired ‘units of environmental performance’ provide incentives for landowners to avoid impacts and to provide effective mitigation or restoration to improve conditions. When regulations establish a cap on allowable activities, such as a total maximum daily load (TMDL) or ‘no net loss of wetland area and function’, then markets allow voluntary exchanges of environmental goods and services between buyers (those seeking offsets or mitigation for impacts) and sellers (those providing environmental benefits). These markets make the costs of environmental compliance and mitigation more evident by tying the cost of impacts clearly to the costs of mitigation, so that there are incentives for both *avoiding impacts* and *providing higher quality* environmental benefits.

Numerous tools and approaches are available for use with market approaches, including direct payments for ecosystem services (PES), ecosystem services markets (e.g., wetland banking, conservation banking, water quality trading, carbon credit trading), tradable permits (e.g., cap and trade), transfer of development rights (TDR), and reverse auctions.

1.1.2 Innovative Approaches to Taxes, Fees, and Incentives

These approaches include alternative ways of implementing traditional funding sources that are designed to raise revenues, as well as provide incentives or disincentives related to environmental performance goals. Examples include a variety of green taxes, ecological value-added taxes, tiered fees or taxes, tax credits or fee-bates, tradable tax credits, product surcharges/sales taxes, and direct and indirect financial incentives. Traditional landowner incentive programs are discussed in the payments for ecosystem services/markets section.

1.1.3 Voluntary Private-Sector Programs

Voluntary private sector programs cover a wide range of tools that can be used to generate new funding from the private sector for the achievement of environmental performance goals. This report focuses on voluntary private-sector programs, as these are most likely to represent new investments for environmental goals in the Puget Sound region. Examples of voluntary private-sector programs include certification programs, corporate environmental performance programs, voluntary offsets or mitigation programs, conservation development, and voluntary surcharge programs.

2 Payments for Ecosystem Services and Markets

Expanding the use of market-based approaches can help achieve Puget Sound recovery by making environmental protection and restoration financially attractive to the private sector and therefore increase private sector spending on Action Agenda priorities. The examples discussed in this section all share something in common: payments are made for each scientifically measurable ‘unit’ of environmental performance. The units vary, from acres of habitat to tons of carbon dioxide equivalents (CO₂e), or from pounds of nitrogen to gallons or acre-feet of water, but the recognition of the *financial value of environmental improvement* provides strong incentives for investment in protection, enhancement, and restoration.

There are two basic market approaches discussed here:

- Programs that focus public-sector expenditures on measurable environmental benefits, referred to as payments for ecosystem services (PES).
- Markets, in which units of environmental improvement are exchanged between buyers and sellers, most typically as a way of ensuring that unavoidable environmental impacts are offset. Referred to as ecosystem services¹ markets, these markets help reveal the costs of environmental impacts and make *both* avoiding impacts and providing high quality mitigation more valuable.

2.1 Payments for Ecosystem Services – Cost-Effective Public Spending

PES programs, as discussed here, involve voluntary transactions in which governments², on the behalf of users or beneficiaries of ecosystem services, directly pay suppliers (usually private landowners) for providing the services. Payments for services are a type of landowner incentive program, because private landowners are provided with financial incentives to protect or restore the environmental values their land provides. This fundamental approach relies on scientifically measurable units of environmental improvement to target government spending in a way that achieves the greatest environmental outcomes.

PES programs are varied and flexible; they can be used in a wide range of contexts to address many different kinds of environmental goals—driven by policy decisions, liability issues, or regulation. Examples of existing PES programs around the world include (Landell-Mills and Porras 2002, Pagiola 2004, Greenhalgh et al. 2007, Kroeger and Casey 2008, Pagiola 2008):

- New York City’s purchase of water filtration services from landowners in the Catskills watershed.
- The North Carolina Ecosystem Enhancement Program (EEP), which pays landowners and private banking companies to provide aquatic habitat restoration to offset impacts from transportation projects.
- The City of Boston’s purchase of floodplain wetlands in the upper Charles River watershed to manage flood hazards and avoid the costs of dam and levee construction.

¹ Ecosystem services are the benefits that ecosystems provide to people; examples include water purification, flood hazard mitigation, and climate regulation (MEA 2005).

² While PES programs can involve transactions between private buyers and sellers (for example, the purchase of watershed services by the Vittel Water Company), most PES programs involve some public sector involvement in establishing the priority services being purchased, providing some or all of the funding, and/or ensuring that the services being purchased meet environmental performance goals.

- Government payments to agricultural landowners for best management practices (BMPs) related to nutrient control, wetland protection or restoration, and habitat protection or enhancement – U.S. Farm Bill conservation payment programs (e.g., Conservation Reserve Program - CRP, Environmental Quality Incentive Program - EQIP, Wildlife Habitat Incentives Program - WHIP, Wetland Reserve Program - WRP); the Canadian Alternative Land Use Service (ALUS) program, and European Union Green Box programs.
- Australia's EcoTender and BushBroker programs, which pay farmers to restore native vegetation and/or protect and enhance multiple ecosystem services, including carbon sequestration, water quality, and native species habitat.
- Government payments for restoration of degraded pasture to provide forest cover, biodiversity protection, and carbon sequestration in Costa Rica.
- State programs that pay for implementation of agricultural BMPs, such as Pennsylvania's Growing Greener Program.

A number of different financing tools are used to fund PES, but most programs use general revenue or appropriations funds and a dedicated budget allocation to pay voluntary participants in the program. Participants must meet eligibility requirements and typically agree to perform one or more actions from a list of approved BMPs — donating conservation easements, implementing nutrient management BMPs, or restoring wetland or riparian habitats. Funds are disbursed until budgets are exhausted or no additional participants come forward, so environmental outcomes depend largely on the size of the budget and the level of voluntary participation.

Although PES programs are very popular, a common drawback is that participation may be limited if the payments are not high enough for the landowner to forego other uses for the land. For example, in payments to agricultural landowners, the cost of implementing BMPs will depend in part on site conditions, and therefore costs will not be the same for every farmer. Standard payment amounts to all participants do not account for these differences, and therefore may not be high enough to provide incentives for all potential participants. This can result in the available funds not being entirely spent (e.g., a common occurrence under the U.S. Farm Bill conservation programs (Greenhalgh et al. 2007). Low or unpredictable levels of participation also mean that some PES programs result in little or no control over the actual level of environmental improvement achieved. It can be difficult to achieve specific environmental goals if participation is not high enough.

Reverse Auctions

One alternative financing tool that addresses these weaknesses is reverse auctions, which are increasingly being used with PES programs (Greenhalgh et al. 2007). A reverse auction is a competitive bidding system, but one in which a number of different sellers compete to provide services or goods to a single buyer. This enables government buyers to locate the most competitive sellers and has the effect of bidding prices down³. Sellers make bids in terms of the amount of the service being provided (e.g., acres of wetlands or pounds of phosphorus removed), and the price per unit of the service provided (e.g., dollars per acre of wetland or dollars per pound of phosphorus removal). This allows the buyer to identify the bids which are the most competitive in terms of providing the greatest environmental benefit for the lowest cost. Reverse auctions also help in determining what price sellers are willing to accept for providing the environmental service. Through use of auctions, PES programs can be adapted to

³ As opposed to traditional auctions where multiple buyers are competing to buy from a single seller, which has the effect of bidding the price up.

ensure that the program budget is sufficient to provide adequate incentives to landowners to motivate participation, and to provide the desired level or amount of environmental benefit.

Reverse auctions provide additional benefits to public sector or government buyers. Competitive auctions allow the buyer to very specifically control the type, or quality, of ecosystem service being purchased—the bid specifications can define the minimum criteria or performance standards that must be met. Auctions can facilitate use of watershed approaches. By setting high standards for the quality of ecosystem service credits, potential sellers are motivated to identify the locations where the greatest environmental benefits can be provided. Finally, reverse auctions provide more certainty about the quantity (and quality) of the ecosystem services being purchased. This is because a buyer can use the auction results to readily see how much environmental benefit will be provided by the pool of sellers who have bid, and how much this benefit will cost. This facilitates achievement of ecosystem protection or recovery goals because it is very clear what environmental outcomes the public money is buying.

2.1.1 Case Studies of PES Programs

The following PES programs are discussed to illustrate design and implementation issues, lessons learned or characteristics of successful programs, benefits of the programs, and potential applications to Action Agenda funding. Additional detail on these programs is provided in Appendix A.

2.1.1.1 Charles River Flood Hazard Management

During the 1960s and 1970s, the City of Boston and communities along the Charles River, became increasingly vulnerable to flood hazards as the population grew, and more and more land within the watershed was converted from forest to developed areas. To respond to the need for better flood protection, in the late 1970s the City of Boston, local communities, and the United States Army Corps of Engineers (USACE) purchased about 7,500 acres of floodplain wetlands in the upper portion of the Charles River watershed to provide flood control services (NAS 2005). The purchase of the land cost about \$10 million. The USACE had estimated that construction of a flood control dam and levee system would cost approximately \$100 million to provide the same amount of flood storage capacity. The upper watershed wetlands were able to handle several large floods in the late 1970s and early 1980s, providing natural hazard mitigation at a cost savings of at least \$90 million.

Key characteristics that made this program successful:

- There was a clear and large difference between the cost of protecting and maintaining the ecosystem service, versus the cost of constructing the engineered, built infrastructure that replaces the service.
- Floodplain wetlands were available within the watershed that could provide significant flood storage benefits.
- There was a high level of public awareness in the region of the importance of the Charles River watershed and a desire to protect the watershed.
- There was a previous high level of successful investment in cleaning up and restoring the Charles River and the watershed.
- A strong watershed group facilitated consideration of alternatives to traditional flood control.
- USACE was willing to work with the community on alternatives to traditional flood management.

2.1.1.2 North Carolina Ecosystem Enhancement Program

The North Carolina EEP is an approach to environmental procurement that uses PES within a regulatory framework and is applicable to the mitigation or restoration of a wide range of habitat types (e.g., wetlands, streams, critical areas, endangered species habitat) or ecosystem services (e.g., flood protection, stormwater management, water quantity and water quality benefits, or open space protection). A key component of this program is the use of reverse auctions to engage the private sector and increase the cost-effectiveness of funds allocated to procuring environmental benefits.

Design Issues: In the 1990s the North Carolina Department of Transportation (NCDOT) experienced significant costs associated with their need to mitigate impacts to wetlands under the Clean Water Act (CWA). Mitigation projects had a high rate of failure, and between 20 to 50 percent of road projects were being delayed because of mitigation requirements. NCDOT also undertook a study of mitigation costs, that for the first time, separated mitigation costs out of individual highway project budgets. Previously, the Board of Transportation had never seen mitigation costs as a single line item, and the estimated cost of \$200 million to \$500 million over 7 to 10 years focused attention on the need for *both* avoidance and cost-effective mitigation to reduce overall project costs.

Design Solution: The need to improve mitigation results and lower costs led to a process of collaboration with more than 10 state and federal agencies to co-create a more integrated way of handling wetland impacts. To facilitate project approval and secure approval from critical stakeholders, NCDOT and other agencies agreed that mitigation should occur years in advance of project impacts, and should replace unavoidable functional losses to wetlands, streams, and riparian buffers. Mitigation goals go beyond compliance to aim at net benefits. NCDOT, with partner agencies, established the initial EEP goals, operating guidelines, and requirements in a Memorandum of Agreement (MOA) in July of 2003. Essentially, the EEP was created to act as an 'ombudsman procurement office' for the procurement of mitigation for unavoidable NCDOT impacts. The procurement program buys and completes mitigation in advance of project impacts. The mitigation 'credits' are used to mitigate unavoidable impacts from transportation projects when they occur; mitigation credits can also be sold to private, non-DOT developers to offset their project impacts.

The EEP process includes the following steps:

- Future impacts and mitigation needs from capital projects (primarily roads) are projected – identifying specific acres of wetland and linear feet of stream impact by watersheds.
- Sub-basins in each watershed are prioritized based on how well they can serve as restoration sites to enhance functions.
- Using reverse auction, a request for proposal (RFP) is issued based on where and how much mitigation will be needed.
- Landowners, private contractors (wetland and stream mitigation bankers), and others identify specific projects and submit detailed information (project location, detailed engineering, hydrological and biological data, and price per unit of restoration) in competitive bids.
- The most cost-effective projects that meet the environmental criteria for the program are selected, and successful bidders are paid to construct their projects.
- Mitigation credits are in place and clear ecological success criteria are met before credits can be used as mitigation for permitted impacts.

- NCDOT projects use the available pool of credits from the bank when these projects need mitigation.
- Mitigation credits that NCDOT does not need can be sold to third parties, thus generating additional money for the program.

The program has been both an environmental and an economic success. Project delays have been virtually eliminated, CWA 404 permitting through the USACE is simple because mitigation is already in place at the time that infrastructure impacts need to be permitted, and the state is moving beyond efforts to merely comply with environmental permits and instead is basing its mitigation practice on a solid foundation of watershed planning (Greenways 2007).

Key characteristics that make this program successful:

- Establishing high standards that go beyond strict compliance is essential to win approval from potentially critical stakeholders.
- Credibility is ensured by having mitigation that meets clear ecological success criteria in place in advance of impacts.
- Use of a watershed approach established equitable service areas and allowed the program to direct mitigation to priority areas within each watershed.
- Reverse auction takes away uncertainty and risk for the private sector (a major factor in discouraging private banking companies elsewhere). In essence, mitigation providers don't have to worry about being able to sell credits, because they are paid for credits up front—this increases private-sector engagement in the program.
- North Carolina invested in solid analysis of future mitigation needs—this greatly facilitated the ability to use reverse auctions to cost-effectively procure mitigation.
- Reverse auctions lower the cost to the State of achieving its mitigation and environmental enhancement goals.
- An accurate assessment of what mitigation was *really* costing NCDOT provided strong incentives for the state to revamp its approach.

2.1.1.3 The New York City Watershed Program

The New York City model illustrates the potential for incorporating PES as a way to fund watershed management and restoration, while saving on the costs of water-related infrastructure. It is the classic example of downstream users paying for upstream provision of ecosystem services. Environmental benefits from watershed services include water quantity and water quality, which are usually the targeted services, but also flood hazard management, drought hazard mitigation, carbon sequestration, and biodiversity or wildlife habitat (Landell-Mills and Porras 2002, Postel and Barton 2005, Guo et al. 2007). Other examples of similar programs for watershed protection as an alternative to built infrastructure for clean water supplies include Seattle, Washington; Portland, Maine; Auburn, Maine; and Syracuse, NY; as well as numerous examples in Central and South America (Landell-Mills and Porras 2002).

Design Issues: New York City's water comes from three watersheds —the Croton, Catskills, and Delaware. Most of the land in these watersheds is in private ownership and not protected from development. Increasing development in these watersheds in the 1980s and declining water quality led to the recognition that water filtration would be needed in the near future to maintain compliance with safe drinking water standards. Cost for construction of the required new filtration plants was estimated at \$5 billion to \$7 billion, with annual operating costs of at least \$300 million.

These costs led the City to evaluate watershed protection and management as an alternative strategy—paying for the maintenance of watershed services was far less expensive, would maintain water quality more effectively, and would produce additional benefits to the region (Appleton 2002).

Design Solution: To initiate the program, the City entered into a program to pay local landowners to implement land uses and land management BMPs that would protect water quality and avoid the need to construct new filtration plants. Water quality results are achieved through a combination of land acquisition, CRP payments for riparian buffer plantings, forest stewardship programs, and involvement of farmers in implementing BMPs. The program was designed from the start to enhance the agricultural economy and support watershed programs at the local level.

The City provides the money and some technical assistance, but a farmers' Watershed Agricultural Council (WAC) administers the program. The approach has become known as 'Whole Farm' planning. Rather than the City determining who participates and what BMPs are used, the WAC, with technical assistance from extension programs and other experts, works with individual farmers to identify the most appropriate BMPs on each farm. The most appropriate BMPs are defined both by the water quality benefits provided, and the ability to be integrated with an individual farmer's business plan. To ensure that water quality standards can be met, the City requires that at least 85 percent of the farmers in the watershed must enroll in the program for anyone in the watershed to receive payments, although participation is voluntary. Strong community control and involvement in the program has been fostered by this approach.

As a result of the program, the City's water quality requirements are being met, and the region's farm communities and economies are supported by the PES program. The cost of the program to date has been less than \$2 billion (less than one-third the cost of the new filtration plants), the City's water is meeting drinking water standards, and about 95 percent of the region's commercial farms are participating in the program.

Key characteristics that make this program successful:

- There is a clear difference between the cost of providing new built infrastructure versus protecting and maintaining ecosystem services through land protection and management.
- There is a clear link between providers and beneficiaries of ecosystem services – the ecosystem services being paid for (via watershed protection) are clearly linked to the needs of downstream users (clean drinking water).
- The large avoided costs for water filtration plants were a strong motivator that created an opportunity to invest in ecosystem services.
- The combination of a voluntary program with a minimum enrollment requirement facilitated a strong collaborative, grass roots component to the program, but also guaranteed that environmental goals would be met.
- Customized solutions offered to each farmer provided additional economic benefits to the farmers beyond the actual payments for implementing BMPs—economic benefits to farmers and water quality benefits to downstream users were both enhanced.

2.1.2 Benefits of PES

PES programs may have a number of advantages from the perspective of providing funding for the Action Agenda. First, these programs are extremely flexible in terms of which ecosystem

services are valued and paid for. Because they are not as dependent on narrowly focused regulations as mitigation or offset programs, PES programs can be targeted more easily at integrated ecosystem management goals. As such, PES programs could be readily designed to direct payments to the achievement of a wide range of environmental and economic goals because:

- They can be goal or priority driven—i.e., governmental buyers can design exactly what they want to pay for.
- They can achieve the integration of environmental protection across jurisdictions (and reduce some of the effects of our current management by separate resource and individual jurisdiction).
- Negotiated payments can make clear to society the true costs of trying to replace ecosystem services or natural capital with built infrastructure.
- They support working landscapes and local economies through landowner incentives.
- While not as responsive as markets would be to price discovery and efficiencies, PES programs can be flexible and adaptable and respond to changes in conservation goals or changes in the supply (and therefore rarity) of ecosystem services.⁴

Like markets, PES programs involve buying measurable units of environmental improvements, but the advantages from a funding strategy may be slightly different and include:

- More cost-effective use of public funds to secure environmental benefits.
- Better accountability—it is very clear what is being bought.
- The relative ease of demonstrating and communicating the benefits to the public.
- Large cost savings through avoided costs associated with built infrastructure and/or repairing ecosystem damage.

2.1.3 Application to the Action Agenda

Existing regulations, for the most part, are designed to prevent further damage or no net loss. PES programs work by specifying exactly what environmental outcomes will be paid for. As such, these programs are particularly good at addressing legacy environmental issues, because payments can be made only for those actions that result in restoration or recovery from past damages. Many of the threats identified in the Action Agenda are the result of past population growth and economic activity – the damage has already occurred and there is a need for actions that remediate for past damage and restore healthy systems. Because PES programs can be designed to achieve specific outcomes, such as protection or restoration of 100 additional miles of Puget Sound shoreline, they lend themselves well to achieving specific improvement or recovery goals.

PES programs are extremely flexible, because payments can be directed at specific environmental goals or targets (e.g., Action Agenda priorities) to ensure they are met, and payments can be adjusted to new priorities as original goals are met and/or new threats emerge. PES programs provide the basis for many landowner incentives programs, and can also be used to initiate markets by providing the initial pool of credits and developing some of the standards and institutional frameworks required by markets.

⁴ As Puget Sound recovery progresses, there may be a need to adjust priorities and actions as initial recovery goals are achieved and/or new threats emerge.

What types of PES could be used to fund Action Agenda priorities?

PES, through a regional procurement program, could be used to focus on projects covering a wide range of the emerging Action Agenda priorities, including:

- Removal of shoreline armoring and restoration of shorelines/nearshore.
- Protection and restoration of estuaries – for hazard mitigation, biodiversity protection, water quality benefits.
- Water quality projects on agricultural lands (e.g., riparian plantings, nutrient management, wetland restoration and/or enhancement, habitat enhancement).
- Retrofitting/low-impact development (LID) BMPs (green roofs, bioswales, wetlands, trees, removing impervious surfaces, disconnecting downspouts).
- Salmon habitat projects.
- Protection or restoration/management of forested watersheds – for water supply, water purification, flood mitigation, runoff mitigation, carbon sequestration, biodiversity protection.

2.2 Ecosystem Services Markets

Ecosystem services markets (also sometimes called environmental markets, offset, or ‘cap and trade’) involve voluntary exchanges between buyers and sellers. The units being exchanged are units of environmental improvement. The demand for services in these markets is driven primarily by a wide variety of federal, state, and local regulations⁵, which require mitigation for unavoidable impacts by providing an equal or greater amount of environmental benefit or improvement. Like the PES programs discussed above, markets are based on buying measurable units of environmental improvement.

When compliance with regulations requires meeting an absolute cap, or a no net loss target (e.g., mitigation or offsetting impacts), it often makes sense both financially and environmentally for project proponents to procure compliance from a third party. The third party provides mitigation that fulfills regulatory requirements, and legal liability for mitigation is transferred from the project to the third party. Such transfer of liability forms the legal basis of the transaction: someone is being paid to offset the impacts of needed economic activity. If the required mitigation is held to a high standard, the cost of purchasing mitigation ensures that the economic activity is conducted more responsibly than it would have been otherwise. Just as importantly, an industry of those getting paid to protect and restore ecosystems is established.

Examples of existing markets and what is being bought include:

- Wetland mitigation banking – units of wetland area
- Conservation banking – units of listed species habitat or breeding pairs
- Water rights trading – acre/feet of water for instream flows
- Carbon markets (regulatory and voluntary) – tons of carbon sequestered in forests
- Water quality trading – pounds of nitrogen or phosphorous reduction; kcal of shade reduction

⁵ Demand drivers also include quasi-regulatory, pre-regulatory, and voluntary drivers. By focusing on the full range of demand drivers, more robust markets can be created with a wider variety of participants. Quasi-regulatory demand includes regulations that do not require mitigation but that require assessment of impacts and seek to balance environmental costs and benefits (e.g., National Environmental Policy Act [NEPA]); pre-regulatory demand drivers are based on the benefits of avoiding potential future regulations such as proactive conservation to avoid future endangered species listings; voluntary demand drivers are based on buyers who have a conservation mission or want to contribute to environmental enhancement as a public service, license to operate, or corporate responsibility (e.g., Business and Biodiversity Offset Program [BBOP]).

- Biodiversity trading – acres of habitat
- Salinity trading – units of salinity reduction in soils provided by native vegetation
- Development rights – units of development as floor/area ratios, height limits, number of allowable lots

A number of market approaches or emerging markets in Washington State can serve as building blocks and models for markets that might be used for Action Agenda funding. Several of these efforts include wetland mitigation banking and the current Mitigation that Works project led by Ecology, the Conservation Markets on rural lands pilot led by the Washington Conservation Commission, the regional TDR marketplace being led by the Washington State Department of Community Trade and Economic Development (CTED), and the emerging carbon cap and trade markets that are being considered under the State's participation in the Western Climate Initiative (WCI). Use of ecosystem markets related to the Action Agenda should build on and be closely coordinated with these existing efforts.

2.2.1 Markets and PES

Markets and PES programs are closely related and can be used together to provide not only more cost-effective and accountable public spending, but also to generate new investments in environmental benefits. PES programs, especially those using reverse auction mechanisms, can be used as a first step to implement markets:

- PES can facilitate market creation by providing an initial 'bank' of high-quality credits that can then be sold within the market. The PES program generates credits in advance of impacts, so that use of these credits is consistent with no net loss or recovery policies.
- Aggregators or entities seeking to facilitate markets (e.g., the Partnership in collaboration with public, private, and NGO partners) can use PES/reverse auction to develop a certain number of credits—the initial public investment is in the form of seed money or a pre-capitalized fund.
- Aggregators then provide those credits to the market, and buyers needing to mitigate for impacts, or conservation investors, can purchase credits.
- If the aggregators or banks are motivated by providing dedicated funding for conservation or recovery, then payments for the initial credits can be used to capitalize a revolving fund that is then used to fund additional protection or restoration projects.
- Once clear demand for credits is demonstrated, private investment would be encouraged in the market to fund the generation of additional credits.

2.2.2 Benefits of Markets

As noted above, PES approaches are ideally suited to cases where environmental protection or improvement goals can be clearly identified and where improvement or recovery is the goal. In these cases, PES is a very cost-effective way of achieving the desired results. Markets can also be used to achieve specific goals, through the setting of caps or limits linked to recovery needs. However, markets are also very well suited to instances where there will be ongoing, unavoidable, impacts from population growth and development. In these cases, markets provide a mechanism for ensuring that funding for environmental mitigation and/or recovery to a cap is linked to economic activity. The greater the amount of economic activity, the greater the level of funding for offsets or recovery.

If, as expected, 1.4 million new residents are heading to the Puget Sound between now and 2020, there will be impacts from the new housing and infrastructure needed. A cap and trade approach to these impacts can be used to make development more responsible by enabling each unit of impact to be tied to one or more units of benefit for a variety of environmental media or

natural resources. Mitigation banking does this with aquatic impacts, conservation banking does this with impacts to the habitat of threatened or endangered species, and emerging carbon markets can do this with greenhouse gas (GHG) emissions. Markets create financial incentives for offsetting impacts, can turn liabilities (e.g., presence of wetlands or listed species habitat) into assets, and can also lower the overall cost of meeting environmental goals, thus freeing up funds for other priorities.

Markets can reinforce support for strong and consistent enforcement of existing regulations, making regulation more effective. Participants in cap and trade markets invest in avoidance or offset measures to achieve regulatory compliance at the lowest cost. Market participants have a vested interest in ensuring that regulations are enforced, because a consistently enforced cap represents a level playing field. If regulations are not enforced consistently, some firms will have an unfair competitive advantage unrelated to how efficiently they are able to meet regulatory requirements.

While the more familiar markets, such as wetland banking, are used in no net loss or cap and trade context to prevent further damage, they can be designed to address legacy issues or target net improvements. This can be done, for example, by using a gradually decreasing cap designed to improve conditions over time. Most proposed carbon cap and trade programs use a phased series of decreasing caps on emissions to initially prevent further increases in emissions and ultimately decrease overall emissions relative to current conditions.

Markets provide several advantages in terms of funding. These include:

- Ensuring that financial resources are available to offset impacts from development – mitigation is in place in advance of impacts.
- Ensuring the financial resources for mitigation are sufficient – impacts do not occur unless mitigation is (or has already been) provided.
- Engaging the private sector in paying for ecosystem services.
- Increasing the cost-effectiveness of regulation by lowering the cost of providing mitigation, thus freeing up resources for other uses.

2.2.3 Examples of Existing Markets

The following sections provide examples of existing markets to illustrate design and implementation issues, characteristics of successful programs, and potential applications to the Action Agenda. The examples are organized around markets that are relevant to Partnership goals and the emerging Action Agenda strategic priorities:

- Water quality source control and nutrient reduction
- Stormwater management and removal of impervious surfaces
- Development that preserves natural areas and limits sprawl
- Protection and restoration of priority habitats and ecological processes (e.g., estuaries, shorelines, wetland or critical habitats)
- Mitigation of climate change (carbon sequestration)

2.2.3.1 Water Quality Source Control and Nutrient Reduction

Water quality trading programs involve the buying and selling of ‘pollution credits’, which can allow a more efficient mix of treatment strategies for achieving Action Agenda water quality goals, and compliance with federal and state water quality regulations. In some cases, water quality trading can also provide significant co-benefits in addition to improvements in water quality – benefits such as open space, improved fish and wildlife habitat, flood hazard mitigation,

or carbon sequestration. Nutrients, sediment, and temperature are the water quality pollutants most suitable for trading programs.

Water quality trading is based on the fact that the costs of reducing pollution differ among individual pollutant sources, depending upon the size of the source, location in the watershed, management or treatment technology, and overall efficiency of the facility. Water quality trading allows dischargers with higher pollution control costs the option of meeting regulatory obligations through the purchase of pollution reduction credits from another source at a lower cost. Pollution sources with lower costs are able to economically reduce pollution discharges below permitted levels, and therefore these sources contribute more to water quality improvements than sources with higher costs. These cost efficiencies thus can lower the overall cost to the region of achieving water quality goals.

2.2.3.1.1 Introduction

Water quality trading has been the subject of great interest for many years, and the US EPA issued a *National Water Quality Trading Policy* in 2003 (USEPA 2003). In theory, the cost savings and environmental benefits of water quality trading are substantial. A recent EPA study estimates that, compared to traditional approaches, pollution credit trading could reduce the total annual cost of meeting designated use standards for water bodies by about \$900 million (USEPA 2002). In practice; however, it is still the case that creating revenue from environmental water management on private property in the United States remains much more theory than practice. The trading programs that have the potential to drive these revenues remain technically complex and are often ineffective (King and Kuch 2003, Landell-Mills and Porras 2002, Woodward et al. 2002, Showalter and Spigener 2007).

Water quality trading programs require at least three components – willing sellers, willing buyers, and regulatory agencies willing to approve trades. Most critical assessments of existing programs identify several barriers or challenges that have resulted in the slow pace of development of water quality trading (King and Kuch 2003, Selman et al. in-progress):

- Lack of adequate demand – usually because regulatory or non-regulatory demand drivers are not strong enough;
- Transaction costs are high – due to the difficulty of getting information and the risk to buyers if credits do not meet performance standards;
- Uncertainty in the estimation of credit values from non-point source BMPs;
- Lack of easily available information on the relative (life-cycle) costs of investment in on-site treatment vs. purchase of credits; and
- Lack of strong support from watershed stakeholders and regulators.

A lack of strong demand for credits is a major reason that many existing programs have not resulted in actual trades. For point sources, demand depends on the difference between the cost of further on-site treatment and the cost of buying nonpoint source credits to offset discharges. However, even though further on-site treatment costs may be relatively high and the costs of non-point source BMPs relatively low, the cost savings from purchasing credits depends on several factors. These include the cost of the non-point source treatment BMP, the trading ratio (how many credits must be purchased to offset a discharge), the transactions costs involved in finding sellers and getting regulatory approval, and potentially the costs of insurance if buyers are liable for the performance of the credits. If buyers are liable if the credits provided by the seller do not perform as expected in terms of pollutant reductions, then the costs of entering into a trade also need to reflect a significant amount of risk to the buyer.

Despite these challenges, several emerging trading programs are beginning to provide successful models of how water quality trading programs could work in Puget Sound. Because meeting Action Agenda goals will require funding specific actions that prevent sources of water pollution, some of the lessons learned from the water quality trading experience can be applied to meet Action Agenda goals. Some of the benefits of water quality trading can be achieved outside of formal markets – for example through bilateral agreements or payments for services agreements. Perhaps the larger opportunity for the Puget Sound Partnership, therefore, will be to apply basic principles from successful water quality trading or PES programs to a range of actions related to water quality. For example, there are numerous non-point source actions that can reduce the loadings of pollutants that enter Puget Sound. Some of these non-point source actions also provide significant environmental co-benefits. Investing funds in managing water quality through watershed protection and non-point source BMPs with co-benefits, can improve the cost effectiveness of water quality projects and improve environmental outcomes.

2.2.3.1.2 South Nation River Phosphorous Trading Program

A relatively new point/nonpoint source trading program that may provide a good model for the Puget Sound region is the phosphorus trading program in Canada, on the South Nation River (O’Grady and Wilson 2002). New point sources in the watershed are facing a zero phosphorus discharge limit. They can meet this cap by totally eliminating their phosphorus discharges, or by purchasing phosphorus credits from farmers at a 4:1 ratio, or purchasing four pounds of phosphorus reduction in farm discharges for each pound of phosphorus discharge needed at the point source. Farmers and other landowners generate credits by implementing BMPs, such as manure and wastewater management, conservation tillage, constructing buffer strips, or implementing on-farm nutrient management plans. The program is based on a clearinghouse model with a central institution that facilitates and brokers trades. A community-based nonprofit organization, South Nation Conservation (SNC), serves as a broker between the point sources and landowners in the watershed. The SNC also assists landowners by providing grants or other financial assistance to help farmers finance BMPs that generate credits. SNC receives funding for its grants from new point source dischargers who are seeking permits, as well as from a number of government-funded programs that facilitate and support the trading program.

2.2.3.1.3 Water Quality Trading in the Willamette Basin, Oregon

Clean Water Services (CWS) serves about 450,000 people in the Portland metropolitan area and is the largest wastewater and stormwater utility in Oregon. CWS operates two wastewater treatment plants that discharge to the Tualatin River, which is impaired for temperature, fecal coliforms, and nutrients. To meet water quality standards for temperature, CWS would need to reduce the temperature of discharges by 1.5° F. Chillers for refrigeration are the only technology solution available and were estimated to cost over \$50 million to install, and \$2 million/year to operate.

Agricultural land uses predominate in the mid- to lower portions of the basin – many riparian areas lack forest cover and the lack of shade contributes to temperature problems in tributaries and in the mainstem of the Tualatin. Working with agencies and stakeholders in the watershed, CWS is developing a crediting and trading program to address temperature issues using approaches that are more cost effective and more environmentally beneficial than is possible with the technological option alone. Private agricultural landowners in the basin that engage in wetland restoration, or riparian restoration with native tree species, can create temperature ‘credits’ based on the length of stream affected and the amount of shade or cooling provided. CWS buys the shade credits to meet a portion of its regulatory requirements to reduce temperature in the Tualatin.

There are multiple benefits associated with this program. Working farms receive supplemental income, temperature conditions in the Tualatin are improved, and CWS is able to achieve compliance with water quality regulations more cost-effectively. Perhaps most importantly for relevance to Puget Sound recovery, achieving water quality improvements through riparian restoration also supports ecosystem recovery goals for the Willamette watershed in terms of salmon habitat, wetlands restoration, and wildlife habitat improvements.

2.2.3.1.4 European Mussel Farming Nutrient Trading Program

To address increasing coastal eutrophication in northern Europe and ambitious nutrient reduction goals coming from the European Union, Sweden is testing and implementing a new nutrient trading program (Lindahl et al. 2005). The increased requirements for nitrogen reductions from point sources are very expensive and result in impacts to the environment. Increasing nitrogen removal at wastewater treatment plants requires large amounts of energy and/or very large areas of land for treatment ponds.

At the same time, modeling and pilot studies show that mussel farming can be used to remove significant amounts of nitrogen from coastal waters, at a fraction of the cost of increasing nitrogen removal at wastewater treatment plants. Pilot programs in Sweden have demonstrated that harvested mussels can be used for human consumption, as animal feed, and/or as organic fertilizer, which can reduce reliance on petrochemical-based fertilizer for local farms. Payments to mussel farmers for this nitrogen removal service, can be a significant source of supplemental income, which can make local shellfish aquaculture viable economically. Pilot projects have demonstrated that payments for nitrogen removal, or nutrient trading, can support a local aquaculture economy and also result in more cost-effective nitrogen removal from coastal waters.

Given the potential for shellfish aquaculture, or shellfish restoration, to provide nutrient removal benefits, a similar approach could be applied to Puget Sound to address local eutrophication and low dissolved oxygen issues.

2.2.3.1.5 Pennsylvania Nutrient Trading Program

Pennsylvania is tightening its water regulations under a 2000 interstate agreement intended to limit pollution in the Chesapeake Bay. This agreement is at least partially motivated by a warning that the EPA will take over regulation if the state doesn't achieve certain pollutant reductions by 2010. The regulated substances are nitrogen and phosphorus, and sewer plants and industrial facilities were given an overall limit on discharge of these nutrients. These restrictions are tied to the 5-year approval cycle for NPDES permits or other discharge permits, and some facilities have several years before they must comply. In addition, animal feeding operations and mid-sized farms must now submit nutrient-management plans to the Pennsylvania Department of Environmental Protection (DEP). DEP's current goal is to limit Pennsylvania's yearly discharges to the Bay from the state's largest watershed to no more than 71.9 million pounds of nitrogen, and 2.46 million pounds of phosphorous by 2010.

Approach

The DEP accepts proposals from non-point sources, primarily farming operations, which agree to undertake verifiable changes in management practice that will reduce pollutants of concern. The 'nutrient net' tool, available online to individual farmers, allows a straightforward calculation of types of BMPs farmers might implement on their land, and how many nutrient reduction credits these practices would generate. As of spring of 2008, a total of twenty-seven credit

proposals have been approved by DEP, which would represent a total of 484,193 pounds of nitrogen reductions. According to the DEP, the most common practices used to generate credits are:

- Cover Crops (early – planted 7 days prior to 1st frost)
- Advance Nutrient Management
- Forest Riparian Buffer
- Animal Waste Management System
- Continuous No Till
- Precision Agriculture

Results

As of May, 2008, despite extensive effort to establish a program to enable trading to protect Chesapeake Bay water quality, there has been very little in the way of real transactions or real environmental benefit. Despite the number of proposals for nutrient reductions from landowners in the basin, trades or purchases of credits are not happening. There are a number of issues preventing more robust implementation, including:

- Lack of clear and consistent methodologies for determining the cost of point source compliance with new nutrient loading limits, due to complexities in flow variation, timeframe for required compliance, and potential changes to allowable limits.
- As a result, significant difficulty in evaluating potential cost savings from purchase of non-point source credits.
- Lack of a clear legal determination that point sources (POTW's) can buy nutrient reduction credits from an exchange without using a conventional procurement bidding process.
- A need to test and refine the calculation methodology for quantifying nitrogen credits generated by the implementation of agricultural BMPs.

Key Object Lessons

The key object lessons that come out of the Pennsylvania programs early results are:

- Landowners have access to an online resource (Nutrient Net) that allows them to see clearly what the specific actions they could take are likely to yield in terms of credits. They could also see the going rate for 'price per credit'.
- It is not clear that overall nutrient reduction requirements for point sources (water treatment plants) could be met cost effectively by comparing cost for internal investment in reductions with cost for purchases via Nutrient Net.
- In order for this kind of trading program to work effectively, it will be essential to have a clear metric for municipal capital cost or annual debt service cost per lbs/yr of nutrient reduction.
- At the same time, this kind of trading program will also require that farmers be able to quickly and easily determine nutrient credits that could be generated from best management practices *and* determine the lost revenue that might result from any implementation of these practices.

2.2.3.2 Application of Water Quality Trading to Action Agenda Priorities

Water quality trading has the potential to directly contribute to the stated goals of the Partnership by providing financial incentives for each measurable unit of nutrient (or other source of water quality impairment) reduction. However, water quality trading has not been implemented before in Washington, so an entirely new program would need to be developed. Water quality trading is complex and there are a number of technical challenges associated with identifying the sources of impairment, establishing appropriate pollutant reduction targets, accurately quantifying the pollutant reductions provided by different actions or BMPs, establishing rules for what qualifies as a credit (i.e., improvement above a defined baseline), and

developing a monitoring and tracking system to ensure predicted reductions are occurring. Start-up costs can be significant. In some cases, a market analysis may determine that a trading program will not be effective. Finally, there are few models for designing a water quality trading program that works in a specific regulatory context **and** also achieves multiple ecosystem recovery goals, but this will be important in the context of Puget Sound recovery.

Under current conditions in the Puget Sound region, demand for water quality credits may be too weak to support trading. In general, point sources are meeting permit conditions now. However, a number of these sources will have to undergo extensive expansion to accommodate higher treatment volumes to accommodate projected population growth. In addition, in some cases, combined storm water/sewage overflows have resulted in exceedances of water quality criteria and/or permit violations. Water quality trading could be used to develop offsets to compensate for intermittent overflows, or to compensate for future requirements of treatment works related to higher treatment volumes. Investing now in water quality improvements through markets or PES, could also potentially avoid future regulations (TMDLs) if further impairment can be avoided. Finally, there may also be possible applications of water quality trading models to the nutrient loading concerns caused by septic systems in areas such as Hood Canal and nitrogen loading/dissolved oxygen issues in the South Sound.

Due to the complexity and challenges associated with developing successful water quality trading programs, an incremental approach is recommended that builds capacity to use market mechanisms, evaluates the feasibility of trading, and begins with a few pilot projects for testing. The incremental steps needed include:

- Develop a system for defining and calculating credits.
- Evaluate and develop a list of approved management practices or actions that can generate credits.
- Build on the preliminary analysis in this report, to systematically evaluate existing programs in the U.S. for lessons learned and criteria for successful trading programs.
- Identify target watersheds that may be suitable candidates for trading.
- Conduct a market analysis and evaluate the feasibility of trading and/or payments for water quality services in the selected watersheds.
- Develop a trading policy framework with watershed stakeholders and Ecology.
- Implement and evaluate pilot projects.
- Depending on the performance of the pilots, create a state-wide policy and implement trading in additional watersheds.

Development of a crediting framework would provide a number of benefits beyond water quality trading per se and is the recommended first step. A crediting framework would define credits and develop consensus among stakeholders and regulatory agencies on calculation methods. Well-defined credits and accepted calculation methods are a necessary condition for water quality trading in the context of regulatory compliance – e.g., formal trading programs under TMDLs. However, a crediting framework will also allow the use of market-mechanisms and flexible approaches to achieve water quality improvements, even in the absence of an approved, formal trading program. For example, credits can be used to quantify the water quality benefits of habitat restoration projects, as part of a process for prioritizing projects that provide the greatest overall environmental benefits. Quantifying credits would also facilitate use of an auction approach to purchase water quality improvement BMPs under a voluntary program. The Natural Resource Conservation Service (NRCS) is beginning to use such auctions in allocating funds under several Farm Bill programs, such as the Conservation Reserve (CRP) and Wetland Reserve (WRP) programs (Greenhalgh et al. 2007).

If the region establishes a framework for providing credits for water quality improvements, then non-formal trading programs could be established. Such a framework would allow individual watershed groups, local governments, and/or point sources to enter into PES arrangement, similar to those described above for New York City. Similarly, a number of projects that use payments for nutrient removal by shellfish to address local water quality issues could support both improved water quality and local economies. This would provide greater financial incentives for water quality improvements projects that also address other Action Agenda priorities, such as fish and wildlife habitat or flood hazard mitigation. The South Prairie Creek project in Pierce County is a good example of a project that could be facilitated by financial incentives for water quality credits.⁶

2.2.3.3 Stormwater Management and Removal of Impervious Surface

Stormwater runoff presents one of the greatest challenges to the Puget Sound region, both in terms of the on-going runoff from past development, or legacy stormwater impacts, and managing the stormwater impacts of future development. This section explores market examples that provide incentives for avoiding and minimizing the creation of new impervious surface, and for removing existing impervious surface.

2.2.3.3.1 Lake Tahoe Coverage Trading Program

The Lake Tahoe coverage trading program offers a clear example of a regulatory market that created financial value for the reduction of impervious surface. The coverage program was designed to address pollutant loadings to Lake Tahoe from increasing development in the watershed; stormwater runoff was the single largest source of pollutants to the lake. The Tahoe program is a model of using ecosystem processes and watershed science to guide market design. The science was used to determine areas that are particularly sensitive to impervious surfaces and how much impervious surface in the watershed was acceptable in terms of the goals of restoring lake water quality and tributary habitats. The Tahoe program also provides a model of how a strong public-private partnership was able to create a market approach to address watershed-wide, multijurisdictional, water quality problems.

Key elements of the program include the following:

- A watershed is assessed for 'important process areas' for stormwater infiltration, runoff, and storage, based on factors such as soil type and slope, and the presence of wetlands, streams, and riparian areas.
- Parcel-specific *allowable impervious surface area* (i.e., square feet of coverage) is assigned based on parcel site conditions and the watershed assessment of where impervious surfaces are most harmful.
- Parcels can be developed up to their allowable coverage credits.

⁶ Pierce County, working with local partners (Cascade Land Conservancy, local landowners, Pierce Conservation District, SRFB) used land acquisition of a former dairy, removal of livestock, and stream and floodplain restoration to significantly reduce bacterial loads in South Prairie Creek, improve compliance with the TMDL, and provide improvements to salmon habitat, flood mitigation, and wetland habitat (Dan Wrye, personal communication).

- Coverage credits can be traded from one parcel to another to allow more impervious surface on some parcels; for non-sensitive parcels, trades can be made at a ratio of 1:1 (no net loss).
- Once coverage credits are traded from a parcel, the parcel is protected by an easement and no additional coverage is allowed on that parcel.
- Coverage trades must be within specified sub-basins.
- There are restrictions on adding more impervious surface on sensitive lands (i.e., important process areas for infiltration and runoff control, or adjacent to streams).
- To use additional coverage credits on some sensitive lands, coverage must be removed elsewhere—for every square foot of additional impervious surface allowed on a parcel, 1.5 square feet must be removed.
- In Nevada, there is no supporting market structure—individual buyers and sellers have to find each other to make transactions.
- In California, a land conservancy (California Tahoe Conservancy [CTC] Land Coverage Program) facilitates the market by acting as a bank or registry for the credits, retiring some credits to promote a net removal of impervious surface, facilitating transactions between buyers and sellers, providing a framework for a streamlined regulatory process, and ensuring the credibility and transparency of the market.
- For the CTC, an initial investment was used to capitalize the program, providing seed money for development of a revolving fund.
- The original \$2 million seed funding has been recycled several times, leveraging transactions of over \$10.4 million (CTC 2008).
- These transactions have resulted in over 2.7 million square feet of coverage acquired by the CTC, 1 million square feet transferred to facilitate new development, and about 900,000 square feet retired (net removal).

2.2.3.3.2 Tahoe Coverage Program Design Issues

Developers of the Tahoe program were faced with a number of significant challenges. Although a clear link could be established between development, impervious surface in the watershed, and water quality problems in Lake Tahoe, development pressure was extremely high and resistance to limits on growth was strong. Particularly challenging was the need for limits on impervious surface to be based on individual parcel conditions, which meant that parcel owners would be treated differently, depending on where their parcel was located.

Water quality issues in Lake Tahoe could only be addressed adequately on a watershed basis. Two states and a number of local jurisdictions had to agree on managing the basin as a whole, with a single set of regulations addressing impervious surface and water quality.

2.2.3.3.3 Tahoe Coverage Design Solutions – Conditions for Success

Key characteristics for success in this program are discussed below and include the following:

- A clear link existed between water quality problems and impervious surface in the basin.
- Stringent limitations were placed on creation of new impervious surface.
- Limitations were based on science.
- Limitations differ among sites based on actual site conditions; benefits on each site are defensible.
- High land values and development pressure provide strong demand for credits.
- Creation of a regional bank/market facilitator has lowered transaction costs.

Rigorous science-based caps were established for allowable impervious area, based on an assessment of the 'level of use an area can tolerate without sustaining permanent environmental

damage through erosion or other causes' (Tahoe Regional Planning Authority, Code of Ordinances, Chapter 20 Land Coverage Standards <http://www.trpa.org/default.aspx?tabindex=2&tabid=172>). The cap directs development away from sensitive areas, while allowing potentially more development in areas of low sensitivity. At the same time, the program was designed to mitigate the impact on private parcel owners by allowing transfer of credits between parcels—new development was constrained but not eliminated.

Even though development is constrained by the cap on impervious surface, because an incentive is created to remove existing impervious surface, there have been numerous cases of private developers purchasing existing parcels with hard coverage and restoring land by removing existing impervious surface in order to develop a new commercial building. The program has been challenged through several court cases related to takings, several of which have been heard by the U.S. Supreme Court. The combination of the land coverage restrictions on private parcels with the coverage trading program has proven legally robust. Development of sensitive parcels is not completely prohibited, the restrictions are science-based, and the ability to sell coverage credits provides owners of sensitive parcels with financial value for their land, even with the development restrictions.

The creation of a regional market facilitator, in the form of the CTC Land Coverage Program, is important in ensuring the success and market activity in the California portion of the program. This market facilitation has resulted in the potential to leverage an initial investment into a revolving fund that has been sustained. It has lowered transaction costs by providing a registry or bank of credits, bringing buyers and sellers together, providing buyers and sellers with easy access to information, assisting with regulatory compliance, and providing credibility and transparency for the market.

2.2.3.3.4 Applicability to the Action Agenda

Impervious surface is a major contributor to water quality problems both in Lake Tahoe and in the Puget Sound region. A similar cap and trade program could be used to address stormwater issues in Puget Sound, while allowing the development that will be needed with future population growth. It may be possible to craft an approach, perhaps on a watershed basis, that would 'cap' impervious surface and provide a clear price signal for each square foot of coverage removal. Caps can also provide incentives for retrofitting the pre-1990 impervious surfaces that pre-date most stormwater management regulations in the region.

The same type of cap and trade approach could also be a model for other regional priorities, where a combination of repairing past damage and preventing future damage is required. A few examples would involve setting caps and establishing incentives for removal of existing:

- Shoreline armoring along Puget Sound shorelines.
- Fill and structures in floodplains.
- Levees and tide gates that are not protecting property.
- Overwater structures.
- 'Fill' in intertidal areas – derelict pilings.
- Fill and structures in estuaries and pocket estuaries.

2.2.3.4 Tradable Development Rights – Development that Preserves Natural Areas and Working Landscapes and Limits Sprawl

2.2.3.4.1 Introduction

Tradeable Development Rights (TDR) programs have the potential to support many of the Partnership goals and priorities of the Action Agenda, including the need for creative landowner incentives, tools to protect intact ecosystems and processes, preventing sources of water pollution, and addressing multiple threats. In addition, TDR programs have great potential to support the twin goals of economic vitality and ecosystem health (Aken et al. 2008).

TDR programs are market-based tools for implementing a community's or jurisdiction's growth policies. TDR programs are flexible instruments that can be used to harness the economic 'engine' of growth and development to protect lands with public benefits, including working farms and forests, open space, and critical or sensitive environmental areas (Pruetz 2003, Pruetz and Pruetz 2007, Aken et al. 2008). The basic exchange in TDR programs is the transfer (or sale) of development rights from private lands with benefits the community wishes to preserve (e.g., farms, forests, wetlands, floodplains), to areas that can accommodate additional growth and where increased development and/or densities are desirable. The parcel giving up development rights is referred to as the *sending* area and the parcel receiving additional development rights is the *receiving* area. Landowners on the sending parcel receive a payment for giving up their development rights, and developers in the receiving areas pay for the right to develop at greater densities or heights than would normally be allowed.

Once development rights have been transferred, the sending area is protected by a conservation easement so that development is permanently precluded on the parcel. TDR programs are not designed to prevent or limit growth, but they do provide an effective tool for communities to direct growth to the places where it is desired. TDR programs also allow local communities to plan more effectively and proactively for future growth.

Key features of TDR programs include:

- *Voluntary programs*; exchanges take place between willing sellers and willing buyers.
- *Market-based*; a marketplace is created where individuals can buy and sell development rights to each other, and prices are freely negotiated.
- *A new source of conservation funding*; payments for development rights provide a new source of conservation funding that helps cities and counties supplement limited public funds.
- *Flexible*; TDR programs can be designed to protect a wide range of public benefits (open space and parks, working farms, natural areas, historic landscapes or buildings, critical habitats), provide rewards in a wide range of incentives (e.g., increased height, floor area ratios, number of units, parking bonuses), and are easily tailored to the needs of local communities.

2.2.3.4.2 TDR Programs in the Puget Sound Region

This region is already home to more than 10 TDR programs, and there is a great deal of local expertise in the use of TDR programs (Aken et al. 2008). Despite the interest in and number of TDR programs, very few are working well, and results in terms of conservation or managing growth have been limited. To address limitations in the current programs, the State Legislature recently initiated a regional TDR program in central Puget Sound, to build on existing programs and assist in the development of a regional TDR marketplace. The Department of Community Trade and Economic Development (CTED) is working with the assistance of Cascade Land Conservancy (CLC) to review existing TDR programs and identify issues, benefits, common pitfalls, and successful TDR program design features.

2.2.3.4.3 TDR Program Design Issues

Although TDR programs are potentially powerful funding and conservation tools, they can be difficult to design and implement appropriately. This section and the next discuss design issues and solutions; a more detailed description of two model programs is provided in Appendix B.

There are approximately 160 TDR programs nationally, the vast majority of which have been developed and are administered at the county level. The rapid growth of these programs demonstrates a great interest in TDRs and has resulted in significant public-sector investment in administrative development. Despite their rapid development, it is striking how few of the existing TDR programs are achieving their objectives. Analysis of TDR programs nationally shows that many existing programs have a very limited number of transactions—in Washington, fewer than half the existing programs have yet to generate any transactions (<http://www.beyondtakingsandgivings.com/>).

Review of existing TDR programs suggests several factors that tend to limit their success (Pruetz and Pruetz 2007, Aken et al. 2008). These factors include:

- **Inadequate receiving area demand and/or demand for increased density.** While most programs have easily identified sending areas where limiting development provides significant benefits, identifying areas where increased density is appropriate or beneficial has been more difficult. Robust markets will need both demand (receiving areas looking for development rights) and supply (sending areas willing to provide rights). There are a number of reasons that demand for receiving areas has been limited. These include the fact that in most places, increased densities, or up-zoning, can be achieved *without* the purchase of development rights, thus severely limiting demand. Buyers also frequently do not receive sufficient additional development rights in the form of density, floor area ratio, or other benefits, to motivate them to buy these rights.
- **Lack of interjurisdictional coordination or agreements.** Identification of appropriate receiving areas usually requires interjurisdictional coordination—cities and counties must agree on where growth and development should be directed and may need to accept sending and receiving areas in different jurisdictions. The current CTED project to develop a regional TDR marketplace in central Puget Sound is one step towards addressing this issue.
- **Infrastructure and amenities for increased density.** Some communities are reluctant to accommodate increased densities because of a concern about increased infrastructure costs or the loss of neighborhood character. The increased infrastructure necessary to support greater densities in receiving areas means greater costs for those communities. The work of the CLC, in particular, has emphasized the importance of ensuring that receiving areas have the infrastructure and amenities that attract growth and increase demand for development rights (www.cascadeagenda.com).
- **Inadequate financial incentives.** The fundamental reason that TDR programs have not been more successful is that it is not sufficiently clear to the buyers that they are getting real value for their investment. Both buyers and sellers need to get sufficient financial return for TDRs to work. Many TDR programs use a ratio of 1:1 for sending and receiving areas. CLC's recent market analysis of TDRs in Pierce County suggests that TDRs are unlikely to be used unless developers can build two or more units for each development right that is purchased. The lack of market studies prior to TDR program design is a significant limitation on the design of successful programs. If buyers do not receive significant returns

from purchasing TDRs, then the prices they are willing to pay landowners will also typically not be high enough to provide incentives for conservation.

- **Marketplace structures and institutional support.** Many TDR programs are established in legislation without any supporting framework or institutional structures to facilitate market development. This can slow or limit use of TDRs because the process is unfamiliar, information related to trades is hard to obtain, it is difficult for buyers and sellers to find each other, the process for transactions is not established, and regulatory requirements or administrative costs tend to be high. Institutions, such as regional banks or credit registries, that facilitate market development can provide support for transactions so that trades are relatively easy for participants to make. Market facilitators can also increase confidence in the credibility of the program by ensuring that trades provide buyers with real development rights and sellers are compensated for permanent protections on their land.

2.2.3.4.4 TDR Program Design Solutions – Conditions for Success

If TDR programs are going to play any significant role in managing growth and contributing to funding in the Puget Sound region, they are going to have to be designed in such a way that conservation goals related to the sale of development rights are well defined. They also need to be designed so that developers can purchase a tangible and specific benefit through the TDR program that they cannot get in any other way.

Characteristics of successful programs include:

- **Ensuring zoning compatibility.** Zoning and development regulations facilitate use of TDRs. For sending areas, sale of development rights must be easier and more financially rewarding than seeking to develop the property under existing zoning regulations. For buyers in receiving areas, purchase of development rights must provide financial value in excess of what can be achieved through development under existing zoning regulations. In sending areas where protection of working farms or forests is the goal, zoning should be compatible with the long-term viability of those activities.
- **Using market studies to fine-tune programs.** Market studies should be used to design programs that provide adequate incentives to both sellers and buyers of development rights. Development of regional models and standard approaches for conducting market studies is one role that market facilitators or market institutions can play. Such standards would make it easier for local jurisdictions to develop effective TDR programs.
- **Creating market institutions and structures to facilitate transactions.** The presence of market facilitators or market support institutions can greatly increase the effectiveness of TDR programs and address many of the limitations to success described above. These institutions can be created by state government, NGOs, or regional councils of public- and private-sector participants. Market institutions can help with education and outreach, technical assistance to local jurisdictions in developing market studies and program designs, facilitating interjurisdictional trades, ensuring equitable benefits between sending and receiving areas (e.g., help with infrastructure needs in receiving areas), and defining appropriate criteria for sending areas (e.g., ensuring that Action Agenda priorities are addressed in selection of sending areas to protect critical water quality source control issues, ecological processes, or habitats) and receiving areas. Market institutions can also function as regional registries or banks to connect buyers and sellers, reduce transaction costs, and enhance the credibility and transparency of markets.

- **Including both incentives and disincentives.** Most successful programs use a combination of restrictions on development and incentives for the use of TDRs to manage growth. Similar to other environmental markets, TDR programs work best when clear, consistent regulations establish mandates or limits. For example, in the NJ Pinelands program, variances to increase density are only allowed with the purchase and use of development rights (Pruetz and Pruetz 2007).⁷ Incentives, such as providing additional funding for infrastructure and amenities to cities that agree to participate as receiving areas, help ensure that markets are viable (Aken et al. 2008).

2.2.3.4.5 Applicability to the Action Agenda

Because TDR programs are so flexible and can be designed to achieve a number of desired goals, and can be tailored to local conditions, they have great potential to successfully support Action Agenda priorities. In addition, the regional marketplace effort underway by CTED should be leveraged to provide a working program for the entire region.

TDR programs can be readily customized to support the Action Agenda by using incentives to direct growth in such a way that impacts associated with habitat alteration, sprawl, and stormwater runoff are reduced. One of the limitations in some TDR programs is the lack of sufficient incentives to use development rights in receiving areas. One way to increase incentives is to increase the value of development rights from certain locations. For example, TDRs from sending areas that contribute to meeting Action Agenda priorities could be exchanged or traded at a greater than 1:1 ratio. TDRs from sending areas that contain high-quality habitats, vulnerable estuarine habitat, floodplain wetlands, support key ecological processes or vulnerable species, or contribute significantly to enhancing water quality would be more valuable than development rights from other parcels. Developers purchasing these rights would receive greater benefits (e.g., greater height or density bonuses) than developers purchasing rights from other areas. Trading ratios linked to desired ecological outcomes would provide stronger incentives for the purchase of development rights, and also greater rewards for landowners who forego development on properties with high ecological values.

2.2.3.5 Conservation Markets – Protection and Restoration of Habitats and Ecological Processes

Integrated conservation markets can provide significant private investment directed to the protection and/or restoration of habitats, species, and ecological processes, consistent with Action Agenda priorities. Markets that focus on land protection or reforestation to provide carbon sequestration can be considered a type of conservation market. Because there are a number of unique attributes of carbon markets, these are discussed in a separate section below.

Conservation markets are a type of ecosystem services market that has been successfully implemented around the world to provide a wide range of benefits (Carroll et al. 2008). The most common conservation markets are those driven by federal or national regulations, such as wetland mitigation banking (CWA 404), conservation banking (Endangered Species Act [ESA] and HCPs), and biodiversity markets in Australia (e.g., BushBroker). All of these markets work because buyers (those needing to offset permitted impacts) provide financial incentives to private landowners for the protection, enhancement, and/or restoration of targeted habitats or species.

⁷ In the NJ program, the term ‘purchase of development credits’ (PDC) is used instead of TDR.

In Washington, wetland mitigation banking has been slow to develop but a number of banks are in operation and the program continues to be refined (Washington State Department of Ecology 2008). Conservation banks under the ESA have not yet been implemented in Washington, but a conservation markets pilot has been initiated by the WCC, and a number of pilot projects have been initiated as part of the Washington Biodiversity Strategy (WBC 2008). Conservation markets could be expanded in Washington to include markets for:

- State priority habitats and species.
- Mitigation or compliance required under local critical areas regulations, such as those regarding wetlands, streams, fish and wildlife habitat conservation areas, aquifer recharge areas, or unstable slopes/feeder bluffs.
- Mitigation required with Hydraulic Project Approval (HPA) permits, if these requirements can be strengthened and consistently enforced.
- No-net-loss of shoreline function under the Shoreline Management Act (SMA).
- Specific ecosystem services associated with particular habitats (hazard mitigation, carbon sequestration).

Conservation markets can contribute to funding and support Action Agenda priorities in a number of ways:

- Provide incentives for private investment on private property to provide restoration and conservation of critical habitats, species, or functions.
- Enable unavoidable impacts from development and economic activity to be offset in a manner that makes it more responsible and more ethical, because high quality habitat restoration has been completed and is in place before impacts occur.
- Assist in providing landscape-scale protection for threatened and endangered species without relying exclusively on public expenditure.
- Avoids temporal losses because restoration/enhancement occurs before impacts.
- Ecosystem (conservation) markets can encourage ecosystem management/whole watershed approaches.

2.2.3.5.1 Conservation Markets Design Issues

Most conservation markets struggle with the same issues that must be addressed for any environmental markets to be successful, either financially or in terms of environmental protection. Critical issues include ensuring sufficient demand for credits to generate enough funding to secure environmental benefits, integrating and coordinating multiple overlapping jurisdictions to ensure markets are not fragmented, lowering transaction costs, ensuring credibility and confidence in the market, and defining appropriate 'service areas', within which different types of environmental credits can be legitimately traded. Recent federal rule changes by the USACE and United States Environmental Protection Agency (EPA) and by Ecology (Washington State Department of Ecology 2008) are addressing some of these limitations for wetland mitigation markets.

Conditions or factors that can limit or reduce demand:

- Service areas need to be based on reasonable ecological boundaries (e.g., watersheds or sub-basins, ecosystem services districts), but if these are too small, there may not be sufficient demand to support a market.
- Single regulation or single resource markets may not generate enough demand; markets that can integrate a number of different regulations and/or sell different types of credits are more likely to generate sufficient demand.

- Lack of strong and/or consistent enforcement of regulations will undercut demand for credits related to mitigation and/or compliance; this has limited the development of wetland mitigation markets in some areas.
- Lack of agreement among multiple regulatory agencies to allow use of credits for their programs limits demand. For example, wetland mitigation markets and ESA markets are still mostly fragmented in the United States; different agencies approve credits in these markets, and there is little coordination between them. The ability to integrate these markets can improve market success. Instead of relying only on buyers looking for wetland credits, combined markets receive investments from both wetland and ESA buyers.
- Most habitat protections in Washington occur and are enforced at the local level, such as critical or sensitive areas ordinances and shoreline programs. Existing conservation markets in the United States are currently not designed to work well with local regulations—markets have to be designed that can scale up, so that at least some local impacts can be offset using credits in other jurisdictions.⁸
- Markets need to be of sufficient size, with sufficient demand, for price signals to work. Prices (incentives) need to be high enough for landowners to participate rather than doing something else with their land, and costs need to be low enough that the purchase of credits is less expensive (for the quality of mitigation received) than traditional permittee responsible mitigation.

Conditions that affect transaction costs and confidence in markets:

- If transaction costs are too high, market participation will be too low for markets to be successful. Transaction costs are increased when there is an absence of supporting market infrastructure, such as registries, exchanges, easily accessible information, and rules and standards.
- A lack of clear market standards, outsider verification or certification, and market transparency, can all reduce stakeholder confidence and participation in markets.
- Confidence is also reduced if there is little or no relationship between regional environmental priorities and the types of credits a market generates. Some wetland mitigation markets have been affected by this because wetland banks were located opportunistically, and not in places where regional conservation priorities could be addressed.
- If transaction costs are high or confidence in markets is low, landowner willingness to participate will also be low.
- Private-sector investors who create credits (e.g., landowners or wetland banking companies) and private-sector buyers (e.g., developers needing to offset impacts) both need to minimize risk and uncertainty associated with participation in markets. Risk and uncertainty are increased if demand is uncertain, if regulatory approval for the use of credits is low or

⁸ The challenges associated with protecting and mitigating impacts to oak woodlands in Western Washington illustrate this well. Oak woodlands continue to decline rapidly, despite city and county critical areas ordinances (CAOs) that require consideration of impacts, and measures to mitigate impacts to these habitats. On-site mitigation is rarely sustainable and fails frequently, and many of the sites available to local jurisdictions for mitigation are not the best places to accomplish mitigation and restoration of healthy oak woodlands. As a result, local regulations may provide little actual protection. A system of regional oak woodland restoration banks, with credits of sufficient quality to meet recovery standards would generate investment in larger-scale, more viable oak woodland habitat projects. On-site mitigation projects would have to demonstrate they are more viable than the alternative of purchasing credits from the banks. If these high quality regional credits were the preferred way to mitigate unavoidable impacts, there would be greater incentives for avoidance of impacts in the first place, and for use of regional credits rather than on-site mitigation.

uncertain, or if the process or timeline for approving and certifying credits is too long and complicated.

- Capitalization – markets can be difficult to start because of the up-front investment in the framework and structures that enable transactions. Without clear market structures and rules in place, the likelihood that trading will occur is low because of the high level of uncertainty about how the markets will actually operate. Investment in generating credits for sale will be slow to develop due to this uncertainty. However, until it is clear that there is adequate demand for credits, it is difficult to justify the expense of developing market structures and rules. As such, markets clearly require strong public-private partnerships to be successful; especially in the early development of market structures and institutions, and in the early investment in creating a pool or bank of credits.

2.2.3.5.2 Conservation Markets Design Solutions

The most successful conservation markets are associated with wetland and stream mitigation markets in North Carolina, conservation banking in California, and biodiversity/ecosystem services markets in Australia (Carroll et al. 2008, Kroeger and Casey 2008, Pagiola 2008). These markets tend to be characterized by clear and strong demand (driven mostly by regulatory compliance), strong public-private partnerships in the development of markets, regulatory agency support and consistent enforcement of regulations, and structures that facilitate exchanges and lower transaction costs. Successful markets tend to have the following characteristics.

Market infrastructure and standards:

- Provide standardized rules, protocols, and frameworks such as those in place for the Australian BushBroker and EcoTender programs, as well as recent improvements in wetland mitigation banking rules in the United States.
- Provide a clear process and requirements for credit approval and verification, clear credit release schedules and rules, clear preference for use of approved credits as mitigation, and certainty about how long the credit approval and release process will take.
- Up-front investment in the administrative infrastructure of markets is needed to create the clear process and standards for entitling mitigation banks or credits in markets. The current average time for wetland mitigation bank approval in the United States is over 2 years, which provides a substantial disincentive for investment.
- Use simple processes for making trades. For example, the Nutrient Net water quality trading system in Pennsylvania is very easy for both buyers and sellers to use—information on available credits and credit prices is accessible, and there is a very easy process for sellers to post their credits to the website and for buyers to find credits for purchase.

Strong government support, clear regulatory standards, and credible markets:

- Strong government support and public-private partnerships provide initial capitalization and ensure that markets have credibility.
- Strong and consistently enforced regulations support sufficient demand and reduce risk.
- Measurable, verifiable environmental outcomes – performance measures that are verified, certified, and transparent, provide stakeholders with the confidence that markets are actually producing environmental results.

- Mitigation through purchase of approved credits⁹ is the preferred approach for mitigation and/or compliance with regulations. Because mitigation is in place in advance of impacts, new Federal and State policies are encouraging use of banks or purchase of approved credits for mitigation. For markets to work in the Puget Sound region, Federal, State, and Local regulatory agencies must agree that approved credits are the preferred compliance solution for wetlands, critical areas, state listed species and priority habitats, shoreline functions, and federally listed species and critical habitats.
- Interjurisdictional agreements allow use of ecologically appropriate service areas that may cross jurisdictional boundaries, so that mitigation can be accomplished at appropriate locations and scales.
- Clear regional conservation and/or watershed protection/ enhancement priorities are in place to guide where investments in protection and restoration should occur.
- Market results, in terms of measurable environmental outcomes, are monitored and reported; net benefits are documented at regional or watershed scales through annual monitoring and reporting required.

Up-front investment in market initiation – public-private partnerships:

- The most successful markets (North Carolina EEP, Australia's conservation markets) have combined the development of markets with an initial PES, using reverse auctions to capitalize an initial offering of credits, stimulate demand, and demonstrate the credibility of credits as legitimate offsets.

2.2.3.5.3 Application to the Action Agenda – Conservation Markets

Clearly, habitat protection and enhancement/restoration is a critical element of success to the recovery of Puget Sound, and conservation markets can align private investment and actions on private land with specific habitat protection goals. This does not mean, however, that conservation markets must be implemented as an entirely stand-alone program, apart from public expenditure, public planning efforts, zoning decisions, or other incentive programs like TDR initiatives. For example, development rights that are traded from properties that can protect or enhance important ecosystem services or habitats and species could receive bonus points, or be traded at a greater than 1:1 ratio.

The existing conservation markets (e.g., focused on wetlands and listed species habitats) should be expanded to incorporate additional ecosystem services and conservation priorities. For example, additional priorities could include critical areas regulated under the Growth Management Act (GMA); shoreline functions that are subject to the 'no net loss of shoreline function' provision of the SMA guidelines; and ecosystem services associated with these habitats, such as flood hazard mitigation, water purification, or shoreline stabilization/erosion prevention. The conservation markets approach could, in fact, leverage many of these existing habitat-related efforts by moving beyond project-specific and resource-specific compensatory mitigation proposals to enable consolidated *landscape-scale* location of habitat banks that contribute to biodiversity and watershed function by extending contiguous protected areas and wildlife corridors.

⁹ Approved credits would include definitions of when, and what types of, resources or services can appropriately be mitigated through the purchase of credits; in some cases, avoidance and protection of the resource may be required.

2.2.3.6 Land-based Carbon Sequestration

Both regulatory and voluntary carbon markets have grown explosively over the past few years (Bayon 2007). Land protection, reforestation, and avoided deforestation projects are currently a very small part of these markets, but they have the potential to provide funding for conservation.¹⁰ Despite the lack of a federal regulatory framework for emissions reductions requirements in the United States, four regional markets are in various stages of development. These markets are paying or will be paying landowners and land managers for carbon offsets from forestry and agricultural projects. These markets are all at some risk of being supplanted by a national system, but they are now underway and are providing revenue to at least 20 significant land conservation and reforestation projects (Bayon 2007).

As long as there are multiple carbon markets, uncertainty about federal actions, and different rules for which projects can participate, land-based carbon sequestration projects will experience significant transaction costs. Consistent approaches will be needed for setting carbon baselines, project eligibility of avoided deforestation versus afforestation/ reforestation projects, monitoring methods, verification rules, and which pools of carbon can be registered—above ground, below ground, and/or harvested wood products. Critical to using carbon markets for conservation, will be rules regarding the use of native species, habitat quality, and biodiversity support to ensure that carbon sequestration projects do not conflict with other environmental goals.

Frameworks for integrating carbon markets and conservation markets are emerging in Washington. The state is participating in the Western Climate Initiative (WCI), and recent legislation directs the state to evaluate market-based carbon offsets from forestry and agriculture. Even in the absence of clear standards and certainty about carbon markets, the Puget Sound region, and Washington generally, would benefit from an approach to forestry offsets that combines measurable carbon offsets with other conservation priorities. The July 2008 draft design for a regional cap and trade program for the WCI will allow the use of offsets for up to 10 percent of compliance obligations. Carbon offsets under the WCI that could be used to also address habitat or water quality goals of Puget Sound recovery include:

- Agriculture (soil sequestration and manure management); and
- Forestry (afforestation/reforestation, forest management, forest preservation/conservation, forest products).

Carbon credits may be developed as part of priority Action Agenda projects, such as habitat restoration, riparian buffer reforestation on salmon recovery projects, conservation-based forest management, watershed protection, urban forest programs, TDR programs, or conservation practices on working farms (habitat projects or no till agriculture). These credits should be documented and tracked. Even before a state cap and trade policy is in place, funds could be generated for the Action Agenda through the sale of carbon credits that also generate water quality, habitat, or biodiversity benefits, on existing voluntary markets.

¹⁰ However, see B.C.'s recent 'net zero' deforestation policy. Deforestation in B.C. releases about 4 million tonnes of greenhouse gases into the atmosphere annually and removes millions of trees that were absorbing and storing carbon. The government has introduced a goal of net-zero deforestation to ensure that BC's forests are protected for the future. This means that when trees from forest land are permanently removed to facilitate a permanent conversion for a different purpose, they will have to be offset with new trees planted elsewhere.

3 New Funding Options – Innovative Tax/Fee Structures and Incentives Programs

This section provides information on various innovative tax or fee structures and incentive programs targeted at the private sector. Tax and fee structures are discussed that reflect new ways of approaching the traditional tax or fee funding sources for many state and local government actions related to the environment. Incentives programs include a wide variety of programs that provide direct payments and/or cost savings to individuals and businesses that take steps not strictly required by regulations, to address habitat protection¹¹, stormwater, resource conservation, and/or water quality. These programs are included in this report because they can be used to provide additional funds for Action Agenda priorities, as well as to affect behaviors that encourage avoidance and minimization of impacts, promote the use of green infrastructure, and encourage conservation.

3.1 Innovative Taxes and Fees – Green Taxes and Fees

These taxes and fees are designed to accomplish two goals: (1) provide incentives for reducing the use of environmentally harmful materials and the consumption of scarce resources; and (2) provide dedicated funds for environmental management, land protection, or remediation of damages. As such, these types of taxes and fees focus attention on the public cost of private behavior. The higher costs resulting from these taxes provide incentives for individuals and businesses to consume less or create alternatives that are less environmentally harmful.

Green taxes are being used in a number of places in the United States and more extensively in Europe, especially in Scandinavia (Andersen et al. 2000). In some applications, green taxes are used to provide incentives for meeting environmental goals (e.g., reduced GHG emissions) and to shift taxes away from behaviors and activities that we want to encourage. In these cases, the taxes are revenue neutral, and allow decreases in other taxes, for example, on payrolls or investments.

The design of green taxes needs to consider whether the primary goal is to provide incentives for changing behavior, shifting tax burdens away from labor and savings, or providing a dedicated fund for environmental management. To provide new funding for the Action Agenda, these taxes would need to be designed to change behaviors and to provide dedicated funding linked directly to Action Agenda priorities. Other design considerations include equity, effects on competitiveness across business sectors or in different communities, how changes in behavior will affect future revenues, legal constraints, and the need for credits/exemptions for low-income groups (Andersen et al. 2000).

Potential green taxes that could be dedicated to Action Agenda priorities might include:

- Flush tax – based on volumes of water or connections used per household or parcel; money would be dedicated to projects that improve water quality – sewer upgrades, non-point source control, septic improvements/replacement.
- Stormwater fees/impervious surface fees – increased rates for developments with no source control, no LID (reduced rates for pervious surfaces, green roofs, green streets, tree planting, disconnected downspouts/rain gardens, etc.), rates based on impervious

¹¹ Most of the traditional landowner incentives programs for habitat protection and water quality (CRP, EQIP, WRP, WHIP) are included above under the discussion of PES programs.

surface, with escalating fees for larger areas of impervious surface. Some portion of funds would be dedicated to assisting with implementation of LID, or retrofitting older systems.

- Sprawl taxes/impact fees (based on area of development, sprawl potential, surcharge for very large lots); money goes to land acquisition, stormwater retrofitting, providing incentives for clustered and/or conservation developments.
- Cumulative impacts fee – levied at the local level, this could be part of an overall increased impact fee structure; this portion would be dedicated to funding habitat acquisition or enhancement/restoration projects to offset the loss of these habitats that is occurring from cumulative, non-mitigated impacts.
- Ecosystem services impact fee – calculated based on the impacts to multiple ecosystem services (air quality, water supply/purification, flood hazard management, habitats/biodiversity, climate, cultural/recreational) and the cost of replacing those services.
- Gas tax – increased gas tax with funds dedicated to highway expenditures that improve environmental performance—e.g., innovative stormwater, stormwater retrofit, wildlife crossings, habitat restoration, culvert replacement, replacing roads over estuaries with bridges.
- Real estate transfer/excise tax – already in place, but the tax could be increased and funds dedicated to local actions in alignment with the Action Agenda – land acquisition, stormwater retrofit/LID, providing incentives for greater density, and clustered or conservation development (there could be exemptions or credits for conservation or clustered developments).
- Small/medium water craft fee (oil/sewer releases) – could be an excise tax or based on marine fuel use (tax on fuel); funds used to promote or provide better waste treatment, spill prevention technologies, as well as for water quality improvement projects.
- Impervious surface tax – based on sale or manufacture of materials that are used to create impervious surfaces (e.g., asphalt, concrete).
- Product surcharges/fees – used with the sales tax
 - Pesticides/fertilizers for both agricultural and household use
 - Hazardous substances
 - Toxic household products
 - Personal care products
 - Energy/water intensive appliances
 - Non-green building materials
 - Bottled water
 - Plastic grocery bags/paper grocery bags
 - Non-recyclable containers/materials

All or most of these could be coupled with tax credits or rebates that provide incentives for modifying behaviors for consumption and/or use of materials that have negative impacts. For example, taxes or fees on water consumption could be eligible for exemptions for installation of water conserving appliances.

3.1.1 Green System Development Charges or Ecosystem Services Districts

These approaches represent two emerging strategies for sustainable local funding; while these approaches have not been extensively tested, the potential to support local level funding related to Action Agenda priorities should be investigated. Some innovative local governments are using these principles in setting impact fees based on a more complete consideration of the true costs

of environmental degradation. For example, in Washoe County, Nevada, the current and future consequences and costs of losing ecosystem services and/or replacing degraded ecosystem services is now being considered in evaluating projects, setting impact fees, and requiring a 'no net loss' of ecosystem services. The City of Damascus, Oregon, is also beginning to implement a similar land use planning approach in which the continued maintenance of ecosystem services is an explicit focus of land use planning and regulations.

A number of the threats that face Puget Sound are the result of the loss or degradation of the ecosystem services that people depend on (Ruckelshaus et al. 2007). The cost of repairing or replacing these lost services falls disproportionately at the local level in the form of the built infrastructure needed for stormwater, wastewater, and/or flood management. A sustainable approach to funding local actions could include the use of green system development charges (GSDC) and/or ecosystem service districts (ESD) to tie revenue to the value¹² of the services provided by the natural environment. For example, current approaches to setting impact or utility fees involves estimating the costs of infrastructure, in the form of roads, schools, stormwater and wastewater facilities needed to support current and future population levels. Impact fees or utility charges are set to allow the community to fund the life-cycle costs of the needed infrastructure.

Typically, the value of retaining green infrastructure, or functioning natural systems, is not factored into these decisions. Retaining floodplains, wetlands, and/or forested open spaces that provide stormwater retention, water purification, and flood hazard mitigation services can allow communities to avoid some of the costs of replacing these services with built infrastructure. By setting GSDCs or impact fees based on the value of green infrastructure, local communities would have a funding source for protecting open space, retaining the services of green infrastructure, reducing the impacts of development, and potentially reducing long-term infrastructure costs to the community.

Ecosystem services districts are based on a similar argument. The beneficiaries of ecosystem services in a watershed or region would be assessed based on the value of the services they receive, similar to the way traditional utility fees are set today. Beneficiaries of ecosystem services include *all* residents of a region at some level. However, some entities benefit disproportionately from ecosystem services and would pay higher assessments – for example, a wastewater treatment plant that can avoid expensive expansion if watershed services reduce nutrient loads or stormwater runoff upstream of the plant. The funds from ESD assessments would be made available to those landowners who contract to continue to supply services to the community. Services that could be valued include water supply and water purification, carbon sequestration, habitat/biodiversity, recreational/open space, and scenic quality or view sheds. Revenues provide additional income and incentives for conservation on private lands. The Forestry Sector Workgroup for Washington's Climate Action Team has proposed ESDs as one approach to retain the carbon sequestration benefits of existing forest lands (www.ecy.wa.gov/climatechange/2008FAdocs/092308_for_esdproposal.pdf).

¹² The value of ecosystem services can be estimated with economic valuation methods, however, the focus of these value assessments is estimating the cost of maintaining and/or restoring ecosystem services or green infrastructure vs. the cost of having to replace those services with built infrastructure, energy, and/or materials imported from somewhere else.

3.2 Incentives Programs

A wide variety of incentives programs for private landowners exist in Washington State and these programs could be used to support programs that help achieve Action Agenda priorities. A good summary of the challenges in coordinating this diversity of programs to meet targeted conservation goals is provided in the *Washington Biodiversity Conservation Strategy* (WBC 2007). To be supportive of Puget Sound recovery goals, regional incentives programs will need to be:

- Better coordinated so that it is easier to track what money is being spent, the effectiveness of expenditures, and results in terms of progress towards conservation goals.
- Championed by strong leadership at the state level.
- Better focused on strategic priorities rather than opportunistic.
- More accessible and easy to use for private landowners.
- Where possible, integrated into ecosystem markets to increase efficiencies and allow for greater private sector involvement.

Incentives programs can be based either on direct payments, or on mechanisms that provide tax credits and rebates or reduced fees.

3.2.1 Direct Payments

Incentives programs based on payments to rural, agricultural, and/or forest landowners are discussed above under PES programs. Other examples of direct payment incentives include programs that pay private property owners to install on-site stormwater BMPs, septic system retrofits, and/or water conservation measures. These programs include grants and very low interest loans. For example, the Shorebank Septic Loan Program (http://www.sbpac.com/bins/site/templates/default.asp?_resolutionfile=templatespath\default.asp&area_2=Our%20Products%20%20and%20Services/Septic%20Loan%20Programs) provides low interest loans that provide 100% of the septic system repair or replacement costs to homeowners in Hood Canal. A number of cities and stormwater utility districts are also beginning to pay residential, commercial, and institutional property owners to retrofit existing structures or install LID BMPs to improve on-site stormwater management. In addition, some local governments (e.g., King County) have programs that provide incentives through direct payments or cost-savings, to businesses that participate in a variety of 'green build' or 'green tools' programs (<http://www.kingcounty.gov/property/permits/info/SiteSpecific/green.aspx>; <http://your.kingcounty.gov/solidwaste/greenbuilding/program/index.asp>).

3.2.2 Fee-bates or Tiered Tax/Fee Structures

Any of the taxes or fees mentioned above could be used with fee-bate or tiered fee structures. Programs that use these tools generally have two objectives: increased rates in some cases to capture the true costs of environmental damage or resource use; and reduced rates for actions that avoid, minimize, or mitigate impacts. Fee-bates have been proposed most frequently to provide incentives for the purchase of fuel-efficient vehicles. A number of states, Canada, and several European countries have implemented or tried to implement fees on the purchase of cars and trucks, with rebates available on purchases of hybrid or fuel-efficient vehicles. Although most fee-bates have been focused on cars and GHG emissions, fee-bates could potentially be used with a wide variety of consumer products or actions. Examples relevant to the emerging Action Agenda priorities include traditional appliances versus energy- and/or water-efficient appliances, sprawl versus clustered/conservation developments, traditional buildings versus energy-efficient and/or 'green' buildings, toxic versus nontoxic household products, or use of

standard stormwater management versus implementation, where appropriate, of LID and source controls.

Tiered fees or sliding fee scales are most frequently used by water, sewer, or stormwater utility districts to promote conservation or the use of source control and LID BMPs. If the rate structure is designed well, such programs provide disincentives for increased impacts and incentives for decreased impacts, as well as greater cost-effectiveness of the overall program. The reduced rates or credits are more than balanced by the increased rates on some users, and the cost savings associated with better management approaches, such as LID. In the case of the Portland stormwater programs, a major motivation for the incentives and reduced fees was the large cost savings of not having to replace aging built infrastructure for stormwater, but rather to avoid the need for much of this infrastructure through on-site source control (<http://www.portlandonline.com/bes/index.cfm?c=34598>).

Stormwater utility examples include the City of Portland's and King County's (<http://dnr.metrokc.gov/wlr/surface-water-mgt-fee/>) stormwater management programs and recently revised rate structures in the City of Seattle, which use lower rates for properties which have implemented LID. Water utility examples include the San Diego Water Authority (SDWA), which offers a savings of \$3 for every thousand gallons saved for properties that install water conservation measures. The SDWA also assists with funding to develop or implement water conservation measures on private property.

Public Benefit Rating/Current Use Taxation

These programs provide financial incentives to landowners in the form of reduced property tax rates for land uses that are compatible with water quality, species, or habitat protection goals. Although not strictly a source of funding for recovery or conservation, these programs can improve the cost-effectiveness of achieving environmental goals. These programs encourage the preservation or restoration of natural landscapes that provide a suite of ecosystem services – water quality, climate mitigation, flood hazard mitigation, view sheds, and habitat support. Tax incentives can help communities avoid the future costs of replacing lost ecosystem services with built infrastructure, which frequently is more expensive than preserving natural systems.

3.2.2.1 Case Study: Stormwater Incentives Programs, Portland, OR

The City of Portland's strategy to reduce combined sewer overflows to the Willamette River includes a series of traditional engineering solutions along with some innovative policy programs focused on incentives for the private sector (<http://www.portlandonline.com/BES/index.cfm?c=34598>). The primary motivation for the Portland programs is to avoid the significant future costs associated with repair, replacement, and expansion of the existing stormwater built infrastructure. Portland has emphasized investments in private stormwater management projects and has created a number of programs with the ultimate goal of developing a marketplace for stormwater goods and services. Components of the current program include direct payment for downspout disconnection, development density bonuses for green roofs or ecoroofs and rain gardens, green streets programs, and discounted utility charges for on-site management of runoff. These incentives programs are designed to encourage cost-effective stormwater source control and enhance urban landscapes.

3.2.2.1.1 Density Bonuses

To encourage the use of ecoroofs or green roofs, this program rewards developers who install green roofs in new developments. An additional bonus of 1-3 square feet of floor area is awarded for each square foot of green roof. Covenants ensuring the permanent maintenance of

the green roofs must be recorded for developers to receive the density bonus. The program has resulted in increased private development at several sites and a total of more than 120 green roofs installed in the City to date.

3.2.2.1.2 Downspout Disconnection Program

To address the increased volumes of stormwater runoff and increasing CSO problems, the City initiated its downspout disconnection program in 1994. The program provides direct payments to individual residences and commercial buildings that disconnect downspouts to reduce stormwater runoff volumes into the combined sewer/stormwater system. The City provides staff who evaluate the potential eligibility of individual properties for the program and provide direct payments to owners who agree to disconnect their own downspouts. The City also provides the option to property owners of City-hired trained contractors to perform the work. The program has disconnected about 1.2 billion gallons of stormwater runoff per year and affected about 56,000 properties since 1994.

3.2.2.1.3 Leveraged Local Improvement Projects – Green Streets

Much of the stormwater runoff within the City comes from public roads and right of ways. The green streets program within the City involves the City partnering with local property owners to use local special assessment districts to leverage additional investments in improving local streets, acquiring open space for stormwater infiltration/storage, reduce discharge of stormwater into local streams, improve watershed management, and manage local street flooding. Local improvement districts allow neighborhood groups to raise funds for these improvements and qualify for City matches to leverage additional funds. The local citizens get improved local streets as well as local green amenities, and the City gets improved stormwater source control at lower overall costs.

3.2.2.1.4 Clean River Rewards Program – Discounted Utility Charges

The Clean River Rewards Program offers reduced stormwater utility rates to commercial and residential rate payers who choose to participate in the program. Rates are reduced based on a site level score that evaluates how well the property can perform on-site treatment of stormwater. For residential properties, the discount can be as high as 35 percent of the overall stormwater fee.¹³ Measures that qualify for reduced rates include disconnecting downspouts from the sanitary sewer system, maintaining healthy tree canopy, and reducing impervious surfaces. The program also includes technical assistance to help property owners design or manage their site to better handle stormwater.

Portland's program is focused on providing incentives and reduced fees for private property owners because source control is often feasible for an individual parcel. However, most of the stormwater treatment needs are related to public roads and right of ways. The Green Streets program focuses on incentives for retrofitting public streets and roads would provide significant additional benefits. Alternatively, there may be more constraints associated with retrofitting or utilizing LID with some public roadways than with implementing these measures on private parcels. As a way to fund more private retrofits to offset the impacts of roads, stormwater fees could be increased on entities that contribute large amounts of impervious surface (e.g., DOTs), and some of those fees could be used to provide funding to individual, privately owned parcels to implement retrofits or LID.

¹³ Discounts are capped at 35 percent for private residences because approximately 70 percent of the stormwater that must be treated comes from public roadways or rights of way.

3.2.3 Tax Credits or Tax Incentives

Closely related to fee-bates and scaled or tiered rates are programs that use leveraged tax credits or tax rebates to provide greater incentives for land protection, habitat restoration, and/or developments that avoid or minimize environmental impacts. Many of these programs are relatively new and still being tested. Some of the earlier programs have had to be restructured as a result of unintended consequences or distortions that were not foreseen in the original design. Based on some limited experience with these programs, they should be considered as potential models, but with the caveat that they must be very carefully designed. Examples discussed below include tradable tax credits and distribution of state taxes to local governments based on conservation.

3.2.3.1 State Programs – Tradable Tax Credits for Conservation Easements

These programs are mentioned here because they have significant potential to provide incentives for conservation.¹⁴ They are also, however, good models of things that can go wrong with incentive programs and point to the need for very careful design.

A potentially powerful tax credit program for conservation is tradable tax credits, which are being used in Colorado, Virginia, and New Jersey and are under consideration in several other states. Tradable tax credits are based on providing a tax credit when conservation easements are donated to the state. Twin goals of these programs are to encourage conservation of private lands and also provide incentives to working lands such as farms, ranches, or family forestry operations. The tax credit is typically a dollar for dollar match of the appraised value of the easement, up to some cap. Because many donors of conservation easements are 'land rich but cash poor', their tax liabilities are generally low and therefore their ability to use the entire tax credit amount is limited. The provision that tax credits can be traded or sold allows entities with higher tax liabilities—typically corporations or wealthy individuals—to purchase the tax credit from the landowner. A typical easement donor might have a tax liability of \$10,000 to \$20,000. With an easement valued at \$100,000, the donor can only realize 10 to 20 percent of the easement value. An individual with a tax liability of \$80,000 can pay the donor \$40,000 and still realize a tax credit of \$60,000. Both the easement donor and the purchaser benefit. These programs clearly provide a strong incentive to donate conservation easements, and the Colorado program has grown rapidly over the past few years.

There have been serious problems, however, with the Colorado program in particular. Inflated easement values and fraudulent appraisals have been a significant problem. In addition, the conservation value of many of the donated easements is questionable or unknown. The Colorado program has been revised twice to address problems and will likely be refined even further in the future. These programs also all rely on income tax credits; it is unclear if these incentives would work as well, or be possible, with property tax credits. Because these provide such strong incentives for conservation, their use in Washington should be evaluated. If it were possible to use tradable tax credits, for example, with the business and occupation (B&O) tax, a mechanism for greater private-sector investment in conservation easements might be feasible.

3.2.3.2 Brazil's Ecological Value-Added Tax

Several Brazilian states have implemented ecological valued-added taxes (VAT) that distribute revenues to local communities based on environmental criteria. These programs are designed to provide incentives to local governments for engaging in conservation measures, primarily land

¹⁴ Tradable tax credits could also fall under the market-based approaches section; they are discussed here primarily because they are an innovative use of a traditional type of tax credit.

acquisition and protection, implementing restrictions on development in sensitive areas, and improved wastewater treatment. State governments are funded largely through a VAT, and typically return about 25 percent of the revenues from the VAT to municipal governments. The ecological VAT increases the percent returned to some municipal governments, based on their environmental performance. The ecological VAT recognizes that conservation measures may entail a cost to local communities in terms of forgone economic development opportunities or reduced tax base from protected lands. To provide incentives to local communities to engage in conservation, the additional VAT revenues allow local governments to continue to fund infrastructure, education, and other government programs, while at the same time promoting conservation.¹⁵

The Partnership has recognized that implementation of the Action Agenda will depend heavily on the actions and performance of city and county governments and communities at the local level. An ecological VAT or sales tax distribution to local governments, based on their environmental performance relative to Action Agenda priorities, could provide strong incentives and support for better performance at the local level. Another approach would be for the state to match local funds that are raised as part of a Local Improvement District, with the specific purpose of meeting Action Agenda goals. Ensuring that environmental protection at the local level does not come at the cost of lost economic opportunities is an important requirement for Action Agenda success. Implementation could be based on a small sales tax increase across all cities and counties in the Puget Sound region; funds would be allocated to local jurisdictions based on performance relative to Action Agenda priorities.

¹⁵ DFID 2006; <http://www.dfid.gov.uk/pubs/files/people-policy-sus-dev.pdf>

4 New Funding Options – Voluntary Private-Sector Programs

The potential for the private sector to become directly involved in funding Action Agenda priorities through voluntary programs is largely untapped in this region, although participation in these programs is growing. One reason for the continued decline of ecosystem health in our region, despite many good environmental regulations and voluntary efforts, is that the perfectly legal activities associated with large numbers of people and economic activities result in significant environmental impacts. Engaging businesses in voluntary contributions to environmental protection and improvements can begin to address these unintended consequences of development and provide additional (private) sources of funding for Action Agenda priorities.

These programs can be either private-sector initiatives or public-private partnerships. Examples include certification programs, corporate environmental performance programs, voluntary offsets/mitigation programs, conservation development, voluntary business/consumer giving programs, and voluntary surcharges. Businesses engage in these programs for a variety of reasons. Cost savings and financial rewards can be significant for some programs that enhance the reputation or brand of a company. Ensuring a continued 'license to operate' or the reputation for being a good corporate environmental citizen, can also be a strong motivation.

4.1 Certification Programs

Numerous certification programs exist that provide incentives for businesses in the form of recognition for good environmental citizenship and/or price premiums from consumers willing to pay more for environmentally responsible products. Familiar examples include shade-grown coffee, fair trade coffee, salmon-safe farm products (<http://www.salmonsafe.org/>), certified timber products (Forest Stewardship Council), certified sustainable fisheries (Marine Stewardship Council), and the Leadership in Energy and Environmental Design (LEED).

Certification programs can provide economic incentives for actions targeted towards achieving environmental goals through capturing greater shares of the market or price premiums. These programs also engage the private sector in new ways in environmental protection and thus bring in additional financial resources that were not previously targeted to environmental results. Finally, certification programs are also good vehicles for educating the public about the values and benefits derived from the natural environment and can enhance understanding and support for recovery efforts. Certification programs designed around specific activities related to implementing the Action Agenda could provide significant incentives for the private sector to spend more money on the protection and restoration of Puget Sound.

4.2 Corporate Environmental Performance Incentives

A growing number of corporate initiatives are focused on enhancing environmental performance beyond what is required by compliance with laws and regulations. Some local examples include King County's EnviroStars (<http://www.envirostars.com/>) and the Port of Seattle's Environmental Stewardship Goals and Green Ports Initiative (<http://www.portseattle.org/community/environment/>).

4.2.1 EPA Performance Track Program

This program is a generalized environmental incentive program where participating companies or agencies negotiate environmental performance standards with the EPA that exceed legal minimums. There is no one specific environmental goal or target, but rather a broad facility-specific goal of reducing environmental impacts. Prospective members develop facility environmental management systems that set policies and targets for reducing pollution, exceeding compliance, or providing some environmental benefit outside of existing regulations. With this plan in place, an implementation and monitoring program is developed to ensure the facility meets these goals. The program first started accepting participants in 2000, and to date, 530 facilities are involved. The EPA estimates that this program has reduced carbon dioxide equivalent emissions by over 309,000 metric tons and reduced water consumption by 5.2 billion gallons.

The benefits for participating in the program include some intangible items such as recognition and networking. Additionally, some green investment firms are also using the Performance Track Program as a way to assess environmental credentials for investments. However, some of the more tangible benefits to participating in the program are reduced administrative costs and regulatory incentives. Participants in the program can benefit from reduced delays and costs associated with permits; monitoring and reporting obligations may be reduced because they already have a monitoring and reporting program in place, and participants have access to revolving funds programs for clean water improvements with favorable loan terms.

4.2.2 BC Hydro Environmental Long-Term Goal

In 2004, BC Hydro announced a corporate wide environmental long-term goal (ELTG) of 'no net incremental impacts' by 2024. This goal recognizes that BC Hydro will need to grow their operations to meet the energy demands of a growing population in the province and that avoiding, minimizing, and offsetting environmental impacts will be required to meet a goal of no net impact. The corporation has made a commitment to develop credible indicators of environmental performance that can be used to track performance relative to the ELTG and will report their performance to stakeholders. While development of indicators is still in progress, the goal itself has already affected corporate culture. There is a heightened awareness of the need for avoidance, minimization, and mitigation of impacts by employees and management throughout the corporation.

Rather than limit their corporate spending on environmental issues to those that they are required to do by law, BC Hydro is investing in environmental performance 'beyond compliance'. Not only will the ELTG improve BC Hydro's environmental performance, but the money invested in the program represents a new source of funding for environmental improvements within the province. Similar commitments on the part of major businesses in the Puget Sound region could be designed in collaboration with the Partnership to target 'no net loss' or 'net benefit' in terms of the Action Agenda priorities.

4.3 Voluntary Offsets Programs

Similar to environmental performance programs, a number of corporations are participating in voluntary offsets or mitigation for their environmental impacts. These are offsets that are not explicitly required by law, but fit with business initiatives related to triple bottom lines, environmental responsibility, and stakeholder and community relations. One of the best developed is the Business for Biodiversity Offsets Program (BBOP), which is a consortium of

businesses with NGO whereby the private-sector partners seek to find ways to voluntarily improve their performance related to impacts on biodiversity.

BBOP programs have been most active in parts of the world where environmental protections are weak and mitigation for impacts is generally not required by law. An example is the investment by Rio Tinto to develop improved avoidance and minimization for mining operations in Madagascar. Additional Rio Tinto investments are being made in the region to enhance land protection, develop local capacity for sustainable forestry and agricultural practices that protect biodiversity, and investments in local capacity building for conservation (<http://www.forest-trends.org/biodiversityoffsetprogram/index.php>; <http://www.riotinto.com/ourapproach/7195-biodiversity.asp>). Conservation efforts in Madagascar are enhanced by the funding received from Rio Tinto, and the company secures a continued 'license to operate' in the country, as well as being able to operate in a way that is consistent with its environmental principles.

The Partnership could leverage existing corporate environmental performance efforts in the region by encouraging and supporting voluntary performance programs focused explicitly on Action Agenda priorities.

4.4 Voluntary Surcharges

A growing number of businesses and consumers are developing voluntary programs for donating money to environmental causes. These involve voluntary surcharges, in which a portion of sales, utility fees, and/or taxes are donated to specific environmental programs or groups. Natural resource agencies in many states have long used voluntary additions to license fees or income/property taxes to generate funding. Depending on where the surcharge is levied, small voluntary surcharges can provide significant amounts of funding.

Some existing examples that provide models for the Action Agenda include:

- 1% For The Planet (<http://www.onepercentfortheplanet.org/en/>). In this initiative, participating businesses donate 1 percent of their sales to a nonprofit organization of their choice. The effort started with businesses with a clear interest in the environment, most notably Patagonia, but it has since spread to a much larger group of businesses. Giving is facilitated by a website where companies and nonprofits register, and donations can be set up directly through the website.
- 'Green Tags', Bonneville Environment Foundation (BEF) – BEF uses the sale of its Green Tags product to generate funds for investment in renewable energy projects. BEF recognized that there was a demand for renewable energy in places where utilities do not offer that choice. Green Tags are purchased from BEF by consumers worldwide, and by many utilities seeking to comply with state-mandated renewable energy standards; Green Tags can be tax-deductible in some cases.
- 'Affinity' credit cards are set up so that a percent of each transaction is donated to a charity or nonprofit organization. These are used widely by University alumni associations and some NGOs.

4.5 Conservation Development

Conservation development or conservation villages are developments that voluntarily use clustering or smaller lots to preserve the open space or the conservation value of the majority of a development parcel, while developing the remainder for housing or mixed use. Conservation developments provide significant benefits to the community, including preserved open space, reduced sprawl and infrastructure costs, reduced impervious surfaces, and habitat

protection. Conservation development is frequently used in combination with certification programs (e.g., LEED). The incentives for developers can include the ability to get a higher return on investment from price premiums, certification programs, density bonuses, or the ability to use TDR, streamlined permitting, and potentially sale of credits on ecosystem markets (e.g., for wetland enhancement, or carbon sequestration).

4.6 Applicability to the Action Agenda

Corporate environmental performance initiatives could be harnessed by the Partnership to encourage increased private sector alignment with, and investment in, Action Agenda priorities. There is a potentially large opportunity for the Partnership to tap existing efforts and encourage new private sector efforts through a 'Corporate Puget Sound Partner' program. This could be coordinated with Ecology and other state agencies to encourage creation of a state 'Environmental Performance Track Program' similar to the EPA program.

Voluntary surcharge programs could also be encouraged to generate donations specifically aligned with Action Agenda priorities. So as not to compete with fundraising by environmental NGOs, the Partnership could support, facilitate, and promote this type of giving in their education and outreach activities, but corporate giving programs would pass money to NGOs that have been designated Puget Sound Partners. Alternatively, this could be one role for the Partnership nonprofit—to facilitate the development of voluntary private-sector giving programs related to the Sound, and to manage these funds to implement Action Agenda priorities.

5 Evaluation of New Funding Sources

5.1 Strategic Approaches to Funding

To produce the kind of results envisioned by the Partnership, funding will have to:

1. Be consistently aligned with Action Agenda priorities, even as these priorities develop and evolve over time. To do this, it will be absolutely critical to be able to say what is being purchased with the money we spend, and to measure the benefits we're actually getting.
2. Be consistent with the guiding principles of the Action Agenda. In particular, be able to address multiple threats and provide multiple benefits.
3. Be able to generate *truly new* sources of funding. This means creating systems that allow private capital to invest in projects that directly contribute to Puget Sound recovery.
4. Be aligned and synergistic with the many initiatives already underway, including the Cascade Agenda, Shoreline Alliance, WCI, Mitigation that Works Forum, Quality Growth Alliance, conservation markets on rural lands, and others.

In addition, a strategic approach to providing consistent and reliable funding must adhere to fundamental principles to obtain broad support. These include basic equity issues regarding distribution of impacts and benefits and a continued emphasis on avoidance and minimization as a precondition for use of mitigation.

5.2 Specific Criteria for Evaluating Approaches to Funding

In developing the recommendations for new funding sources, we focused on the characteristics of successful programs from the review of existing tax, incentive, and PES/markets programs. A number of additional criteria were also considered for identifying the most promising new funding options. These criteria were chosen to reflect the ability of funding strategies to achieve environmental goals, the potential to add to the existing funding base for the Action Agenda, and implementation feasibility. Criteria considered included:

- Consistency with existing regulatory and non-regulatory drivers.
- Existence of institutional and legal barriers.
- Feasibility and potential to readily adapt existing laws and regulations.
- Strong demand for services related directly to Partnership goals and Action Agenda priorities.
- Adequate supply of services related to Partnership goals and Action Agenda priorities.
- Consistency with ecosystem based management.
- Consistency with traditional funding mechanisms.

6 Conclusions and Recommendations

While there are many valuable, innovative funding tools that utilize taxes/fees, incentives, and markets, it is recommended that the Partnership use a three-pronged strategy in developing **new innovative** funding sources for the Action Agenda:

1. The Partnership should establish a regional payment for ecosystem services program, and eventually an ecosystem marketplace, to achieve implementation of the Action Agenda.
2. Expand the use of green taxes and tax incentives.
3. Vigorously promote voluntary corporate programs – a Corporate Puget Sound Partner program.

The first strategy, development of a regional ecological procurement program as a way to initiate ecosystem service markets, is our major recommendation and should be **the key focus of the Partnership in developing new funding sources** that are consistent with the goals of the Action Agenda. This strategy has the potential to significantly increase funding through actions that are directly implementing Action Agenda priorities. A regional procurement system would involve (1) direct purchase of environmental outcomes through the use of an auction to generate an initial pool or bank of credits, and (2) a public regional registry, where the units of improvement purchased—measured in acres, linear feet, pounds, and so on—are listed to *prime the pump* for a regional ecosystem market. An initial round of public procurement for these environmental outcomes will establish price-points, along with clear ecological success criteria, for each ‘product’ on the registry. Credits would be in place to then support development of a revolving fund for conservation through the sale of credits to offset the impacts of needed development.

The other two strategies should be facilitated and supported by the Partnership but accomplished primarily by state, local, or private-sector partners. These strategies represent sources that can provide supplemental funding for Action Agenda implementation and support the goals of the Partnership, but they should not be the primary focus of the new funding strategy. This section describes the overall recommendations, while Section 7 describes the immediate next steps needed to begin a phased implementation of new innovative funding sources.

6.1 Priming the Pump for a Regional Ecosystem Marketplace

The Partnership should create a Puget Sound regional procurement program and registry as the first step in developing an ecosystem marketplace to (1) meet Action Agenda goals cost-effectively, and (2) generate new investment in Action Agenda implementation. This procurement system should build on and incorporate existing programs—the regional TDR marketplace pilot, conservation markets on rural lands pilot, Mitigation that Works and potentially an ‘in lieu fee’ program for aquatic resources mitigation, and the evolving carbon cap and trade program under the WCI. The initial procurement effort would generate a bank or group of credits that reflect net benefit in terms of specified Action Agenda priorities. The Partnership would then facilitate the creation of a regional ecosystem marketplace in which credits could be purchased to mitigate unavoidable impacts of new development or purchased and retired for conservation. The sale of credits would *establish a revolving fund* in which new economic activity pays for the next round of projects to generate environmental benefits and credits for sale.

The key features of this recommendation and steps to implementation include the following:

Regional Procurement and Registry for Action Agenda Priorities

- Procurement of ecosystem services (or environmental benefits) is driven by Action Agenda priorities—for example, protecting high-quality estuary habitat, protecting and restoring ecological processes, restoring shoreline habitats, salmon recovery, addressing stormwater, and preventing water pollution at the source.
- The initial step would be the use of reverse auction, whereby the Partnership identifies and funds priority procurement projects through a competitive bidding process. The Partnership can specify the type, amount, quality (performance standards), and location of the environmental benefit needed —bidders compete to provide the specified benefit at the lowest cost to the Partnership. Bids can be submitted by local governments, tribes, NGOs, or the private sector.
- The Partnership in effect serves as an aggregator to develop a bank of credits in this initial step by securing the provision of a specified amount of environmental benefit related to habitat, species protection, water quality, or stormwater management.
- The Partnership would create a registry to track the type, number, and location of credits that have been procured. The registry serves to provide accountability for the benefits being procured and to hold the credits for eventual release in a market.

Seed Money/Capitalization of the Fund

- The seed money to procure this first phase of environmental benefits could come from a variety of sources: existing state funding, new federal appropriations, new fees levied on regional 'ecosystem services districts' organized by watershed—similar to Public Utility Districts (PUDs), but the basis for the fees would be for maintenance and/or restoration of ecosystem services.
- Seed money could also potentially be provided in part by collaborating with Ecology on a new in lieu fee program for aquatic resources mitigation, if such a program is implemented by Ecology. Ecology could fund part of the initial step related to generation of high-quality wetland restoration credits that are aligned with Action Agenda priorities (e.g., estuaries, wetlands providing water quality or flood storage benefits). These credits would be held in the registry until performance standards are met and then released for sale as part of the in lieu fee program. Mitigation fees that are paid into the in lieu fee program would be used as part of the revolving fund to support additional wetland protection and restoration.
- Seed money could also come into the procurement system by encouraging private investment from the growing number of companies investing in ecosystem markets (e.g., Bluefield Holdings, Inc.; EKO Assets; Equator, LLC). These companies would get a return on investment through receiving a portion of the future sale of credits.

Creation of Market Framework, Standards, and Protocols

- While the initial group of projects is being implemented and credits are being generated, the Partnership should lead a group of stakeholders (federal, state, and local agencies; tribes; NGOs; private sector) to establish the market framework and standards and a regional registry for holding and tracking credits. In addition, the Partnership (with stakeholders)

should create a market framework for exchanges that incorporates standards and protocols for verifying and certifying credits, ensuring performance standards are met, credit release schedules, units or currency for accounting, and service areas for different credit types.

- The Partnership would be the holder of the credits generated by the first set of reverse auction projects. The generation of these credits would provide, within a few years, a concrete, measurable demonstration of specific improvements related to Action Agenda priorities. The regional registry would provide a means of documenting the benefits—supporting accountability and transparency for the Partnership’s efforts.
- The regional registry could also be the holder of credits generated by other related programs in the region. For example, existing and emerging TDR programs could be incorporated into the registry and marketplace, so that separate certification, tracking, verification, and exchange protocols do not have to be developed for each program. In addition, this approach would facilitate the ability of TDR programs to provide greater value for development rights that also provide significant environmental benefits, in terms of ecosystem services or species and habitats protected.
- Similarly, as the current conservation markets and in lieu fee programs for wetlands are developed, they could easily be incorporated into the regional registry and marketplace. This would allow individual programs to continue but would provide a greater level of credibility for individual programs and greater robustness for the overall market.
- During the course of market development, the Partnership would work specifically with federal, state, and local jurisdictions to ensure use of credits generated by the procurement program for regulatory compliance. It will be necessary to ensure that credits represent tangible environmental results that can be used as offsets for compliance with a range of regulations or types of impact.
- A particularly critical role for the Partnership would be to facilitate the incorporation of local land use regulations—critical areas and sensitive areas ordinances, shoreline management plans—into a regional mitigation marketplace. Most of the unavoidable impacts that require mitigation, as well as most of the cumulative impacts that go unmitigated currently, are regulated at the local level. The ability to use credits from a regional bank to offset impacts within local jurisdictions, at least in some cases, will be critical to adequately offsetting impacts from future development in the region.
- This interjurisdictional, interagency coordination would ensure that demand is sufficient to generate revolving funds and would help to ensure rigorous and consistent enforcement of regulations across the region at federal, state, and local levels.

Sale of Credits and Creation of a Revolving Fund for Conservation

- This first group of credits would eventually be available for sale to individuals or entities needing to provide mitigation for unavoidable impacts (e.g., regulatory buyers such as developers, Washington State Department of Transportation [WSDOT]) or for permanent retirement for conservation (voluntary conservation buyers).
- Sale of credits would generate money for a revolving fund that could then be used to pay for additional procurement projects using reverse auctions. Because future growth will require some level of ongoing mitigation for unavoidable impacts, if this source of money is directed

to the regional procurement program through the market, Action Agenda priorities can continue to be funded by ongoing economic activity.

- As the market demonstrates that there is robust demand for credits from regulatory-driven buyers, the Partnership can seek and encourage additional private-sector investments in the procurement program. Given the projected growth of the region, it is likely that private-sector investment will develop on its own—i.e., investors will fund their own projects to generate credits and then sell the credits directly in the marketplace.
- The marketplace would initially focus on credit types that are directly tied to Action Agenda priorities and also have existing regulatory requirements to mitigate for unavoidable impacts, such as acres of high-quality wetland habitat; protection or restoration of critical areas, such as eelgrass beds and estuaries; or areas that protect and maintain shoreline functions, such as unarmored shorelines, feeder bluffs, and forage fish beaches. The marketplace would be designed, however, to incorporate additional environmental markets as they arise; for example, a regional market in land-based carbon offsets under the WCI, or under voluntary carbon markets.

6.1.1 Examples of Purchases for the Regional Procurement Program

Priority targeted purchases by the Partnership Regional Registry to prime the pump for an ecosystem marketplace could include a number of actions related to Puget Sound recovery priorities. Implementation should begin with two types of credits that are directly related to critical threats to the Sound – stormwater/impervious surface and shoreline armoring/restoration of shoreline functions:

- **Measurable units of shoreline restoration.**
Puget Sound currently has 750 miles of shoreline armored with bulkheads or riprap. A bid process to contract for private-sector partners to remove linear feet or miles of hardening could provide scale approaches to cost-effective ecological benefit. Credits on the Partnership Regional Registry could then be purchased for mitigation of shoreline development or related but out of kind activities. Caps on new shoreline armoring could be established within the current guidance for no net loss of shoreline functions in the Shoreline Management Act.
- **Measurable units of impervious surface reduction.**
Puget Sound has experienced a 10.4 percent increase in impervious surface over the past 10 years. *In conjunction with* a trading system to tie impervious surface impacts to related offsets, a procurement process using public funding could increase incentives for removal of impervious surface and related measurable results. Credits on the Partnership Regional Registry could then be purchased for mitigation of additional impervious surface impacts. Caps on new impervious surface could be established in the context of local watershed planning or critical areas ordinances.

Future types of credits that can be incorporated into a regional marketplace would include:

- **Measurable units of stream restoration.**
In conjunction with Ecology and USACE, ensure that linear feet of stream restoration are compatible with banking requirements in the new rule covering §404 of the Clean Water Act. Credits on the Partnership Regional Registry could then be purchased for mitigation of unavoidable stream impacts.

- **Measurable units of wetland restoration.**
In conjunction with Ecology and USACE, ensure that acres of wetland restoration are compatible with banking requirements in the new rule covering §404 of the Clean Water Act. Credits on the Partnership Regional Registry could then be purchased for mitigation of unavoidable wetland impacts.
- **Measurable units of nutrient pollution through land management.**
POTWs in the region will have to undergo extensive expansion to accommodate higher treatment volumes within the timeframe of the Partnership goals—between now and 2020. In addition, combined stormwater/sewage overflows have resulted in exceedances that, while in compliance with existing codes, are still a problem for water quality in the Sound. Nutrient reduction credits on the Partnership Regional Registry could be purchased for mitigation of future point source or legacy septic nutrient loading.
- **Measurable units of stormwater reduction best practices.**
The Partnership Regional Registry could directly invest in certified projects that provide square feet, gallons, linear miles, or other metrics of:
 - Green roofs and water tanks
 - Tree planting
 - Use of new street sweeping technology
 - Narrower streets with designed infiltration
 - LID elements
 - Ditches as mini-treatment systems, including both design and maintenanceCredits on the Partnership Regional Registry could then be purchased for mitigation of runoff impacts created by development or infrastructure projects.
- **Measurable units of tradable development rights.**
The Partnership could directly invest in acres of sending areas. Credits on the Partnership Regional Registry could then be purchased by developers in receiving areas to provide density, floor area ratio, height, or other desirable 'beyond zoning' benefits for their projects.

6.1.2 Regional Registry/Marketplace Standards, Structure, and Framework

A regional procurement program, registry, and marketplace will all require sufficient standards and protocols to ensure credibility, accountability, and transparency. Stakeholders in the region will need to be assured, and able to verify, that the environmental benefits being provided by the program are real and are achieving the performance required to support the Partnership's goals.

6.1.2.1 Market Standards and Framework

To be credible, a procurement program or ecosystem marketplace must contribute to achieving real environmental improvements. To verify this, performance measures related to market functioning need to be in place. Performance measures should be related to the type, number, and quality of ecosystem service credits generated by the marketplace, and ultimately linked to the overall goals and targets for ecosystem recovery established by the Action Agenda. Objective verification and certification of credits are necessary for credibility. This requires: (1) an agreed-upon method for measuring credits—an accounting system or currency; (2) performance standards or measures that credits must meet (e.g., conservation easements on land, quality of wetland area); (3) a system for certifying that credits are real; (4) a way to track credits through all steps in the process—production, certification, sale, and retirement; and (5) provisions for insurance to provide a buffer against unforeseen losses.

6.1.2.2 Market structures and function

Market standards and frameworks for accountability and transparency can be provided by certain necessary market structures and functions. These will need to be created at least at the regional Puget Sound level to allow credit trading and markets in Washington. Key structures and functions include:

- An accounting system, with tools to measure debits and credits. Systems that all stakeholders agree to that standardize how the ecosystem service benefits provided are calculated and what units are traded. Standard and accepted methods are available for a number of credit types, including carbon, impervious surface, nutrients for water quality trading, and some types of habitat (e.g., wetlands). Accounting tools need to be relatively simple to implement, but robust enough to provide confidence that they capture the environmental benefit of interest.
- Registries are required for tracking credits and providing transparency about what credits are available, of what quality, whether credits have been certified as meeting standards, what credits have been bought and sold, and at what prices. Registries allow exchanges more readily and can greatly lower transaction costs by making it easy for buyers and sellers to connect. Registries are also important for providing credibility for markets—by tracking and maintaining information on credits, they can ensure that credits cannot be sold multiple times. Associated with registries are processes for verifying credits, ensuring that the number and quality of the credits placed on the registry is accurate. Certification of credits by third parties is also a function associated with registries.
- Exchanges provide a process and framework for making transactions; they allow buying and selling to take place without the need for individual buyers and sellers to negotiate each transaction with separate rules. Exchanges also contribute to lowering transaction costs.

6.1.3 Benefits of a Regional Procurement Program and Registry

To ensure adequate funding for the Action Agenda, the Partnership will need to provide a mechanism for *cost-effective compliance* with a whole range of existing (and potential future) regulatory requirements, so that developers and businesses can buy what they need to conduct their affairs responsibly without having to reinvent the wheel each time. Establishing certainty around environmental compliance and streamlining regulatory processes will allow resources currently spent on compliance processes to be spent directly on avoidance and mitigation actions.

In addition, the Partnership will need to leverage substantial private-sector investment by enabling the infrastructure that *allows cost-effective compliance to also serve as a source of cost-effective supply of environmental improvement*. Stimulating environmental markets that create demand from multiple sources—compliance, remediation, and conservation buyers—can leverage additional private-sector investment. It is the development of clear *demand* for ecosystem services created through restoration, conservation, and stewardship actions that will catalyze additional private investment at scale in the Puget Sound region. There is significant private capital looking for places to invest in supplying ecosystem services, but only in geographies where sufficiently clear demand justifies the risks involved in projects that must create measurable high-quality environmental results to be successful.

The creation of a Puget Sound Regional Procurement Program and Registry is a comprehensive approach designed to allow the Partnership to accomplish the tasks essential to recovering the health of the Sound in the context of continued rapid growth. The Regional Registry will:

- Leverage and harmonize a host of disparate financial incentive efforts now underway—these programs can form the *building blocks* of a regional strategy, but not if they remain disparate, unrelated efforts.
- Work in conjunction with existing efforts underway by federal and state agencies and nonprofit organizations (e.g., the Shoreline Alliance, the Cascade Agenda).
- Provide a mechanism for *cost-effective compliance* with a range of regulatory and incentive program requirements.
- Serve as a source for cost-effective purchase of environmental improvement for any interested buyer, including government and philanthropic sources.
- Generate additional private investment in Action Agenda implementation.

6.1.4 An Action Area or Watershed Demonstration

It is strongly recommend that the Partnership pursue a region wide procurement program due to the benefits of region wide integration of disparate regulations and jurisdictions, programs, and actions, as well as the market volume benefits of a region wide approach. However, any of the individual programs described in this report could be implemented at a smaller scale as a demonstration project to provide the first step in implementing larger programs (see Section 7). If the creation of a regional procurement approach is not feasible as a first step, then the Partnership could select a demonstration region (Action Area or watershed) for a pilot project. The objective of a pilot would be to demonstrate the effectiveness of a market approach through a comparison between results achieved through comprehensive use of incentive and market approaches in the pilot region, and the results achieved elsewhere in the Sound without these approaches. Program designs and tools could also be developed and tested at this smaller scale prior to being adopted throughout the region.

If the kinds of market and incentive programs described in this report did not exist, the Partnership would raise funds and direct expenditures through more traditional mechanisms. The selection of a specific watershed or county within which TDRs, habitat banking, water quality trading, impervious surface trading, and credits for land-based carbon sequestration would be put to work can provide a clear demonstration of the *amount of environmental improvement per dollar spent* in comparison with the more traditional approaches.

6.2 Additional Options for the Partnership to Explore

6.2.1 Expand Use of Incentives, Green Taxes, Tax Incentives, and Fee-bates

The Partnership should work with stakeholders to expand incentives programs for the private sector. In addition, the Partnership should work with the Department of Revenue, the Department of Ecology, other state agencies and local governments to explore the future use of a suite of green taxes, tax incentives, and fee-bates to be used at the state and local levels to promote environmentally beneficial actions as well as provide funding for Action Agenda priorities. The initial list of potential taxes and tax incentives described here should be evaluated for legal issues, revenue potential, impacts on economic activity, equity impacts, and ability to provide local revenues to support local governments in implementing the Action Agenda. A focus of these strategies should be to enhance the capacity of local governments to gain supplemental sources of funding for meeting their responsibilities towards recovering Puget Sound while also affecting behaviors that encourage avoidance and minimization of impacts, promotes green infrastructure, and encourages conservation of resources.

6.2.1.1 Expand the Use of Incentives for Individuals and Businesses

The Partnership should facilitate and support the expanded use of incentives to the private sector to support habitat restoration and stewardship, water quality, and stormwater runoff management. An immediate implementation step should include developing and implementing stormwater incentives programs for cities and counties, similar to the model program in the City of Portland. Such programs would use tiered rate structures and/or grants to provide direct payments and other financial incentives to private individuals, businesses, or local improvement districts that implement stormwater retrofits, LID practices, and/or removal of existing impervious surface.

6.2.2 Promote a Puget Sound Corporate Environmental Performance Program – Corporate Puget Sound Partners

The Partnership should create a Corporate Puget Sound Partner program that incorporates ideas from certification programs, voluntary offsets, or restoration actions modeled on the Business and Biodiversity Offset Program (BBOP) initiative, corporate environmental performance and sustainability efforts, and voluntary surcharge programs. The program would encourage and recognize private-sector contributions to Puget Sound recovery directly through voluntary investment programs and/or through environmental performance/sustainability programs. The Partnership would work collaboratively with businesses to ensure that corporate programs are in alignment with Action Agenda priorities, encourage participation within the business community, work to develop criteria for the program that facilitate and support business investment in recovery, and provide incentives in the form of recognition as a corporate partner. Additional incentives for businesses include price premiums for certified products or performance standards (e.g., LEED), alignment with individual business sustainability goals, and enhanced license to operate in the region.

7 Near Term Implementation Steps

Fully developed markets and incentive-based market mechanisms will not produce measurable outcomes immediately. Implementing the incentives and markets recommendations as outlined in the previous section will take some time, but implementation can be phased to begin with pilots that demonstrate the benefits of these approaches and allow testing of program designs. Some concrete steps can be taken immediately and this following section outlines two programs that can produce results in the short term, while the larger policy and program initiatives are under development. Near term recommendations should focus on:

- Expand incentives to the private sector for improving water quality and stormwater management;
- Initiate the regional ecosystem service markets and supporting registry database through environmentally beneficial and cost-effective compliance and mitigation projects that also fulfill Action Agenda priorities;
 - Use targeted procurement to establish a bank of aquatic habitat credits that could be used to provide wetland/stream mitigation credits and capitalize a revolving fund in 1-2 pilot watersheds.
 - Evaluate the feasibility of water quality crediting and trading.
 - Implement pilot cap and trade programs for impervious surface and shoreline armoring.

7.1 Water Quality and Stormwater Incentives for the Private Sector

Incentives to the private sector for water quality improvements can provide cost-effective and flexible options for the private sector in meeting water quality goals. Two programs are recommended as near term actions:

(1) *Expand payments for water quality improvements related to nutrients, fecal coliform, sediment or temperature impairment in watersheds experiencing these problems, or likely to experience impairment in the near future.* Payments would provide incentives for private land owners or businesses to implement non-point source reductions that lead to measurable water quality improvements. Payments could be made for installing improved agricultural or forestry management practices (e.g., planting riparian buffers, improved nutrient/sediment management, or retaining conservation or wetland reserves). Individual homeowners could receive payments for septic system improvements and/or removal of impervious surface/LID retrofits.

Payments would come from expanding existing grant or loan programs, such as the Conservation Reserve program. Funding could also potentially come from entities seeking to avoid future costs, similar to the New York City watershed model. For example, wastewater treatment plants may be able to avoid the need for expanded capacity or expensive new treatment technologies by paying land owners for water quality improvements in upstream portions of a watershed. Use of a reverse auction or targeted procurement approach would enhance the cost-effectiveness of these programs.

(2) *Provide more incentives to the private sector for improving stormwater management (water quality and water quantity issues).* The Partnership should work with a willing city, county, or stormwater district to develop and implement a model incentive program for

stormwater modeled on the successful City of Portland and King County¹⁶ incentives programs. Incentives are targeted to actions that produce improvements in stormwater source control or on-site treatment (e.g., LID, disconnection of downspouts, green streets). Incentives would be in the form of either direct payments, or pricing mechanisms such as tiered rate structures combined with fee-bates or reduced rate structures for specified actions.¹⁷ Stormwater incentives would be provided to individual landowners as well as businesses, and could be applied both in urban and in more rural settings.

Funds would come in part from existing grant/loan programs and revised surface water or stormwater fee structures. Stormwater fees should be based on the actual amount of impervious surface on a parcel; individual owners, businesses, or institutions that can reduce the amount of impervious surface would pay a lower utility fee. Additional fee reductions or fee-bates would be established for parcels that implement approved LID techniques. Finally, direct payments in the form of grants or loans would be available for individuals, businesses, or institutions that retrofit existing facilities with approved LID techniques that substantially reduce or eliminate stormwater runoff from a site. This fee structure would provide two types incentives for reduced stormwater impacts - reducing impervious surface footprints for lower rates, and receiving additional price breaks and/or direct payments for implementing LID. The direct payments incentives would be especially important for encouraging retrofitting of existing impervious surfaces.

In addition, these programs should be linked to payments from entities within a basin or local area which have limited and/or very expensive options for on-site stormwater control. These entities would pay for off-site stormwater retrofits or LID implementation at locations where these will result in greater improvements in stormwater treatment at lower cost. Agreements could be in the form of bilateral negotiations or MOUs among those needing to treat stormwater, those interested in implementing LID, and appropriate regulatory agencies. Payments for stormwater retrofit/LID could also be made under an impervious surface cap and trade program, in which entities needing permits for new impervious surface could purchase credits from an equal or greater square footage of impervious surface removal elsewhere (see markets description elsewhere in this document).

Example stormwater incentives scenarios include:

Cities or counties faced with CSO problems may be facing very expensive engineering solutions to physically separate stormwater from sewer infrastructure. The same or greater environmental benefits might be achieved at lower cost through source control and/or LID techniques at multiple locations. Actions that control runoff at the source on individual parcels and/or disconnect parcel-level stormwater from the combined system would reduce overall volumes and frequency of overflows. As an alternative to investing in very large built infrastructure re-engineering, funds could be spent more cost-effectively in the form of incentives to private landowners to remove or retrofit existing impervious surface to reduce the amount of stormwater flowing into the combined system.

¹⁶ King County's Water and Land Resources Division program for stormwater fee structures, discounts, and financial incentives provided for runoff mitigation, retaining forest cover (65-10 discount), pervious surface absorption, and impervious surface reduction, and/or open space preservation; and financial and permitting incentives for green buildings and LID under King County's Green Tools Program.

¹⁷ Washington law allows this type of flexibility in developing stormwater utility rates and some jurisdictions – for example King County – are already using tiered rate structures or fee-bates for implementing certain approved practices.

State or local departments of transportation frequently face very limited or no options for stormwater treatment at the project site. When on-site treatment is possible, the costs can be very high, especially compared to the marginal environmental benefits. Rather than attempting to treat road-generated stormwater runoff on-site, DOTs could provide payments to individuals and businesses within the basin or watershed to retrofit existing impervious and/or implement LID. Retrofitting existing impervious surfaces, esp. with LID techniques, such as green streets and green roofs, could be used to offset (at more than 1:1 to achieve a net benefit) stormwater impacts anticipated from new road construction or widening projects. Candidate pilot projects include the Alaskan Way Viaduct replacement, SR520, and I-5 repaving/corridor improvements in the Seattle metropolitan area.

Based on the outcomes of the initial pilots, the Partnership should work with regional stakeholders to require implementation of an incentives-based fee structure and direct payments system (or cap and trade) for stormwater management throughout the Puget Sound region.

7.2 Expanding the Use of Ecosystem Service Markets

Ecosystem service markets allow the exchange of environmental credits among buyers and sellers. Most are driven by regulatory requirements, such as mitigation or water quality compliance, and most buyers are developers, industries, or utilities that need credits to address permitting requirements. Many are set up under “cap-and-trade” regulations, which set caps for pollutants or habitat alteration, but allow permittees the option of acquiring credits to address their requirements. Sellers include mitigation bankers, conservation organizations, entrepreneurs, and government agencies that agree to produce credits through restoration or cleanup projects. Caps can be set to achieve ‘no net loss’ goals or to achieve recovery to a level specified by the cap.

Ecosystem service markets are evolving rapidly worldwide, driven largely by cap-and-trade approaches to the reduction of greenhouse gas emissions. The new funding sources recommendation for the Action Agenda includes three market approaches: 1) the creation of an in-lieu-fee mitigation program; 2) further development of a water quality trading framework; and (3) development and implementation of two cap and trade pilot programs focused on achieving water quality (stormwater) and shoreline restoration (shoreline modification) goals. Initial implementation steps for these programs involve the development of the trading platform, crediting protocols, and project implementation strategies.

(1) *In-lieu-fee mitigation program.*

The Partnership should coordinate development of the in-lieu-fee mitigation program and cap and trade pilots. This would allow the creation, testing, and refinement of an umbrella banking or trading platform and institution with consistent standards for the region, to achieve better environmental results at lower cost. This structure can then be expanded to include markets for additional resources linked to Action Agenda priorities.

(2) *Evaluate the feasibility of water quality trading.* A regional water quality crediting and trading framework would allow regulatory agencies, point source dischargers, and non-point sources to develop a more efficient mix of treatment or source control options – end-of-pipe control technologies, as well as source control through prevention or reduction of pollution at diffuse sites within a watershed. The cost efficiencies associated with trading can lower the overall cost to the region of achieving water quality goals, while also providing significant co-

benefits in the form of habitat restoration, flood mitigation, and/or carbon sequestration. However, because of the complexity of developing successful water quality trading programs, feasibility assessment and careful program design are necessary first steps.

First, the Partnership would work with Ecology and EPA to determine the necessary components of a water quality trading program, complete the evaluation of existing programs in other states to determine conditions for success, and develop a draft water quality trading model framework. This program could then be tested and refined through a pilot project in a specific watershed, which would invest in projects that generate water quality credits for purchase, in a manner similar to the in-lieu-fee mitigation program. Subsequent steps would build on the evaluation of the pilot project and develop a Sound-wide or state-wide water quality trading policy and implement water quality trading on a larger scale in the region.

(3) Cap and trade pilots for shoreline armoring and impervious surface. The Partnership should work with a willing county or watershed group to initiate two cap and trade pilots – one for impervious surface and one for shoreline armoring. An initial focus on removal of impervious surface and shoreline armoring will address two of the critical threats to Puget Sound health identified by the Action Agenda. The first pilots would focus on cap and trade programs that could be established in the near term, based largely on existing regulations and/or local watershed and land use planning efforts.

For example, the ‘no net loss of shoreline function’ guidance for local shoreline master plans could be the basis for setting local caps on new shoreline armoring. A cap and trade program would allow armoring to occur if it is needed, but only through the removal of an equal or greater amount of existing armoring and the restoration of shorelines. Information from existing scientific assessments such as the work of the Puget Sound Nearshore Ecosystem Restoration Program (PSNERP) or local shoreline master planning characterizations would be used to establish appropriate caps. For example the level of armoring allowed under the cap, where armoring would be strictly prohibited, and areas where removal of existing armoring would provide the greatest environmental benefit would be set by science-based shoreline characterizations.

Similarly, impervious surface caps could be established for individual watersheds or basins, based on existing levels of impervious surface, water quality or flow impairment related to stormwater, and capacity to manage stormwater through restoration of natural systems for infiltration and storage. New impervious surface or changes to existing developments can occur, but only with the removal or retrofit of an equal or greater amount of impervious surface elsewhere. Existing impervious surface that can be removed to restore natural infiltration and/or storage becomes financially valuable, which provides incentives for individual land owners to remove and/or retrofit existing impervious surfaces.

Impervious surface or shoreline armoring cap and trade programs would facilitate meeting the Action Agenda goals of restoring shoreline function and addressing stormwater at the source, provide flexible options for private sector in meeting regulatory requirements, and provide financial incentives for shoreline restoration and reducing impervious surfaces. Pilots could be implemented first at a watershed/basin or County scale, and then expanded to cover additional areas within the region. Depending on how well the pilots function, similar cap and trade approaches could be developed in the future to provide cost-effective approaches for addressing other Action Agenda priorities, such as removal of overwater structures, derelict creosote pilings, structures in floodplains, or restoration of threatened habitats.

8 References/Citations

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APPENDIX A – PES Model Programs

PES Model Programs – Detailed Descriptions

The North Carolina EEP Model

The North Carolina Ecosystem Enhancement Program (EEP) is an approach for environmental procurement that is applicable to either the protection or restoration of a wide range of habitat types (e.g., wetlands, streams, critical habitats, open space) or ecosystem services (e.g., flood protection, stormwater management, water quantity and water quality benefits).

A key component of the North Carolina EEP is the use of reverse auctions, which are a powerful tool for increasing the cost-effectiveness of funds allocated to procuring environmental benefits.

Program Summary

The North Carolina EEP is an example of government acting as a consolidated purchaser of environmental improvement results through a competitive procurement process. The program provides programmatic mitigation and develops watershed-level protection and enhancement to replace *functions* prior to these impacts occurring.

From 2003 through 2007, EEP has spent \$156 million on restoration projects and provided high-quality offsets for North Carolina Department of Transportation (NCDOT) impacts in the form of 540,000 feet of stream and 1,400 acres of wetland. At the same time, NCDOT has permitted 252 projects without delay, and has 763 future permits (covering projects through 2013) ordered through the EEP system. Of these future projects, 365 already have mitigation ready, and 398 future permits have mitigation that is being actively pursued. Contracts have been let to 16 different companies, and the \$156 million expenditure has helped to create and bolster a robust ecosystem services industry in the state.

As impacts are identified, NCDOT contracts with private firms to facilitate wetland or stream mitigation projects that are planned, designed, constructed, and monitored on property acquired by those firms. This process includes the following steps:

- Solicit proposals from interested contractors.
- Review qualifications and prequalify contractors (currently 30 listed).
- Identify mitigation needs by location, habitat type, and amount.
- Issue a request for proposals (RFP) to qualified contractors.
- Review proposals.
- Conduct site visits with NCDOT staff.
- Evaluate and select appropriate sites based on price and potential.
- Negotiate and enter into contracts with selected firms.

Evaluation of contractors' proposals is done by NCDOT environmental staff based on two criteria—technical quality and cost. After a selection is made, the contractor's proposal is made part of permit applications.

Background and History

In the 1990s, 20 to 50 percent of NCDOT's projects were held up because of mitigation requirements at any given time. In addition, NCDOT undertook a study of mitigation costs

that, for the first time, *rolled them up* out of their individual project budgets. Previously, the Board of Transportation had never seen mitigation costs as a single line item, and the estimated cost of \$200 million to \$500 million over 7 to 10 years focused attention on *both* avoidance and cost-effective mitigation in a new way.

This began a process of collaboration with more than 10 state and federal natural-system agencies to co-create a more integrated way of handling wetlands impacts. NCDOT and other agencies agreed that in order to facilitate project approval and secure approval from critical stakeholders, mitigation should occur years in advance of project impacts and should replace unavoidable functional losses to wetlands and riparian buffers.

NCDOT, the North Carolina Department of Environment and Natural Resources (NCDENR), and the U.S. Army Corps of Engineers, Wilmington District (USACE) established the initial EEP goals, operating guidelines and requirements in a Memorandum of Agreement (MOA) in July of 2003. Essentially, the EEP was created to act as an ombudsman procurement office for NCDOT impacts.

NCDOT funds EEP to plan and implement needed mitigation, including ongoing monitoring and maintenance, and the funding procedure is audited by an external group.

The EEP begins the process by identifying specific acres of wetland and linear feet of stream impact in each of North Carolina's 54 hydrologic Cataloging Units (CUs), prioritizing sub-basins within each CU based on how well they can serve as restoration sites to enhance functions and values for the larger CU. Once impacts are identified, an RFP is issued, and landowners, private contractors (wetland and stream mitigation bankers), and others identify specific projects and submit detailed information for consideration by the EEP on a competitive basis. Information in the bid packages submitted includes project location; detailed engineering, hydrological, and biological data; and price per unit of restoration.

Private parties can also purchase mitigation from projects completed under the EEP process, which allows the program to pool the impacts and consider larger tracts of land at mitigation sites.

Results

The program has been both an environmental and an economic success. From the starting point of 20 to 50 percent of projects delayed, the NCDOT's Project Development and Environmental Analysis Group reports that *not a single project has been delayed due to mitigation needs* since the implementation of the program.

For the USACE, the process is very simple, because the sites proposed for mitigation are already completed *before* they are submitted as proposed mitigation for transportation infrastructure impacts.

According to Bill Gilmour, EEP's Director, "EEP reflects the state's commitment to leave behind the old project-by-project strategy and focus on quality mitigation that provides substantial benefit and protection to the state's natural resources while promoting responsible economic

growth. The state is moving beyond efforts to merely comply with environmental permits and instead base its mitigation practice on a solid foundation of watershed planning.”¹⁸

The program relies on private-sector partners and public-private cooperative initiatives, partnerships that access the expertise of consultants and contractors. The program forged an innovative agreement with the state’s land trusts to promote land acquisition and open-space preservation to protect the state’s most precious lands from development and the subsequent loss of wildlife habitat and stream buffers. From 2003 through 2007, EEP has spent \$156 million on restoration projects and provided high-quality offsets for NCDOT impacts in the form of 540,000 feet of stream and 1,400 acres of wetland. At the same time, NCDOT has permitted 252 projects without delay, and has 763 future permits (covering projects through 2013) ordered through the EEP system. Of these future projects, 365 already have mitigation ready, and 398 future permits have mitigation that is being actively pursued.

Contracts have been let to 16 different companies, and the \$156 million expenditure has helped to create and bolster a robust ecosystem services industry in the state. The cost of mitigation is averaging 2.81 percent of the overall cost of highway projects, and *no* projects have been delayed since the EEP commenced operation in 2003.

Key Object Lessons

1. Rolling up cost items hidden in individual project budgets to a higher level enables better understanding of the costs of the current approach to one-off mitigation.
2. Investing sufficiently in projecting future impacts allows RFPs (or reverse auctions) to be designed on a watershed basis to provide meaningful compensatory mitigation.
3. Private-sector interest and capability can be leveraged to identify, design, and implement specific projects. Bids, including sufficient detail for evaluation, are prepared at no cost to the public, and the competitive nature of the bid process ensures cost-effective procurement *and* price discovery.
4. Establishing high standards that *go beyond the strict letter of compliance* is essential to win approval from potentially critical stakeholders. EEP insisted that projects be fully in place and that clear ecological success criteria be met *before* any credits would be released to allow NCDOT projects to move forward.

Summary

The fundamental approach of centralized procurement, leveraging private-sector interest and capability in providing *measurable units of offset* for unavoidable public-sector infrastructure impacts, seems well-suited to managing Puget Sound growth. In cases where funding for projects is coming from appropriation (ISTEA 21, etc.), state taxes, or bond measures, managing mitigation on a consolidated basis rather than a project-by-project basis makes eminent economic *and* ecological sense. The use of the RFP process to ensure competitive pressure on costs, and the use of clearly measurable criteria for the bid submissions helps to ensure that the public gets what it is paying for and fulfills the Partnership mandate for accountability.

While the EEP model is used for clearly defined aquatic impacts under the Clean Water Act, the approach could be used in the Puget Sound for purchase of other ecosystem benefits, as defined in the details of the Partnership process. These could include:

¹⁸ “North Carolina - Leading the way in advanced mitigation, despite growing pains”, Greenways, Volume I, Issue 4, October 2007

The New York City Watershed Model

The New York City model illustrates the potential for incorporating payments for ecosystem services as a way to fund watershed management and restoration while saving on the costs of water-related infrastructure. Environmental benefits include water quantity and water quality, which are usually the targeted services, but also include flood hazard management, drought hazard mitigation, carbon sequestration, and biodiversity or wildlife habitat (Guo et al. 2007; Postel and Barton 2005). Other examples beyond New York include programs in Boston, Massachusetts; Seattle, Washington; Portland, Maine; Auburn, Maine; and Syracuse, New York, as well as numerous examples in Central and South America (Landell-Mills and Porras 2002; Postel and Barton 2005).

Summary

The payments for ecosystem services (PES) approach developed in New York City to protect water quality in the Catskills watershed may not be directly applicable to the Puget Sound in any specific location, but nonetheless it is clear that it contains many key object lessons that could assist in achieving Partnership goals. Upstream/downstream links between Bellingham and the Nooksack River watershed, between Everett and the Snohomish Basin, and between Birch Bay and Dayton Creek in Whatcom County are all examples of locations where these principles may be applied.

As Partnership funds are put to work on reducing nutrients entering Puget Sound fresh and marine waters, on managing stormwater runoff, and engaging in watershed and basin planning efforts, the model described here provides approaches for connecting specific beneficiaries with the programs that protect their resources and ways of comparing watershed management costs with technical or 'built infrastructure' approaches to achieving similar benefits.

Finally, the New York City model contains particular lessons on the social dimension of implementation of watershed approaches to water quality improvement.

Background and History¹⁹

Probably the most famous example of applied ecosystem services theory is the investment made by New York City in watershed management programs in the Catskills for water quality improvements to protect the City's water quality. New York's water comes from three watersheds that cover an area of 2,000 square miles (830,000 hectares), nearly the size of the state of Delaware.

The Croton River watershed supplies 10 percent of the City's water supply. Due to rapid residential development and non-point source pollutants such as eroded soils, lawn fertilizers, poorly controlled septs, spilled motor fuels, industrial toxics and solvents, and hydrocarbons leached from roads, the decision was made by the late 1980s that water from this watershed would have to be filtered to maintain compliance with safe drinking water standards. The cost for filtration was close to \$1 billion and over \$50 million a year to operate.

¹⁹ Adapted from a paper presented by former Commissioner of the New York City Department of Environmental Protection and Director of the New York City Water and Sewer system, Al Appleton, at the 2002 Katoomba Group meeting in Tokyo.

As a result of this experience, the City was willing to consider new approaches for management of the Catskill-Delaware watershed system, which provided 90 percent of the City's water when water quality problems began to surface there. Only 30 percent of the total land in the watershed was in public ownership and protected from development. The remaining portion had been devoted to family farm agriculture, woodlot forestry, and outdoor recreation-based tourism, with a sprinkling of small local villages, all with low impact on water quality. But by the 1980s, the viability of those traditional rural activities was steadily declining and they increasingly turned to intensive agricultural practices, concentrated livestock management, more intensive silviculture, and vacation home development.

A consensus began to build that a filtration plant would need to be built for the water from this watershed in addition to the Croton plant, and the estimated cost of a filtration facility with enough capacity and backup to process the 1.5 billion gallons a day of water that the watershed then provided the City was \$4 billion to \$6 billion dollars, with another \$250 million in annual operating costs.

Initial calculations showed that a comprehensive program of watershed protection would cost far less than filtration, would maintain water quality even more effectively, and would produce numerous other benefits as well, both for New York City and also for the Catskills, whereas a filtration strategy would protect water quality but would do nothing for the Catskills. Instead of paying to clean up the results of polluting and degrading the pure water produced by the Catskill watershed, the City would pay to protect the rural Catskill environment.

Implementation

The question then became how to translate that strategy into a detailed action plan. Rather than a pollution source by pollution source approach, the program focused on a basic approach of filtration avoidance that was based on *farming as a preferred land use in the watershed*. The program came to be called Whole Farm planning, and functioned with the City paying for the staff costs of the program and the capital costs for pollution control investments on each farm as an incentive for farmers to join. The farmers administered the program through a self-selected Watershed Agricultural Council on which the City and other governmental stakeholders had a vote, but held a minority of seats. The Council contracted with local farm support services and academic resources to provide needed technical assistance, and also contracted with independent academic institutions for monitoring and research.

The key to the program was how the pollution control was designed. Instead of selecting a top-down menu of best management practices to be applied to each farm, the typical non-point source pollution regulatory approach, the Whole Farm program provided each farm with a technical team that, with the full participation of each farmer, designed custom pollution control measures for each farm to maximize their effectiveness and minimize their cost. A particularly important feature of this custom design was that the measures were selected not only for their pollution control benefits, but also to be designed into and integrated with the farmer's business plan and management practices for his farm. Thus the farmer not only reduced pollution at no cost, but also gained significant ancillary business benefits as well.

To ensure that water quality standards would in fact be improved, the City allowed farmer participation to be voluntary, but required that 85 percent of farmers participate in the watershed and reserved the option of reverting to traditional, enforcement-based water quality regulation if they did not. The only limitation was that the City would hold harmless all the farms who have actually participated in good faith in the program.

Results

Within 5 years after the City and the Catskill farmers created the Whole Farm program, 93 percent of all the farms in the New York City watershed had chosen to participate. The cost of restoration has amounted to less than \$2 billion—less than a third of what the plant would have cost. The City’s plan meanwhile supports not only water purity but other important services still provided “for free” by the Catskills.

It is clear that the Whole Farm program, along with direct land acquisitions, Conservation Reserve Program payments for riparian buffer plantings, and forest stewardship programs, has played a significant role in protecting water quality. The City’s water quality monitoring program demonstrates that the quality of New York City’s drinking water remains high and meets all health-related state and federal drinking water standards. Today, almost 95 percent of the commercial farms in the City’s Catskill/Delaware watersheds participate in this voluntary program, which works to reduce agricultural pollution while improving the economic viability of the farms involved.

Key Object Lessons

1. Upstream/downstream links focus on ecosystem approaches that minimize built infrastructure investment. Avoided cost for technological water treatment solutions were the key driver that created ecosystem investment opportunity.
2. While the program relied on voluntary participation, the requirement that 85 percent of the farmers in each basin had to participate to enable payments to flow towards pollution reduction measures ensured environmental results.
3. The customized solutions offered to individual farmers on a consultative basis provided economic benefits to farms along with water pollution reduction benefits to downstream users.

Application to the Puget Sound Context

While the Hudson River/Catskills system and its critical role in providing New York City’s drinking water may not have an exact analog among the 20 major river systems in the Puget Sound region, the essential nature of the upstream/ downstream link finance model recognizes the dependence of urban populations on the behavior of individuals and the management of ecosystem resources in the watersheds that supply them. Especially as global warming continues to affect snowpack and runoff, the management lessons from the Catskills could be applied to the same type of water quality related behaviors purchased by downstream residents there. Alternatively, these management lessons could be adapted to concerns more specific to the Puget Sound, such as limits on exempt wells in water stressed basins.

While a payment scheme like the one devised in New York cannot create more water, the approach of payments distributed to voluntary participants in specific programs designed to ameliorate the tension between need for instream flows and upstream water use *but only on the condition that 85 percent of the water users upstream participate* has the potential to balance at least some of the property rights/public goods issues that have made water supply such a critical concern to the residents of Puget Sound.

APPENDIX B – TDR Model Programs

TDR Model Programs

8.1.1.1.1 Program 1: Douglas County, Nevada: A Rural County Model

Douglas County, Nevada, population 28,000, is located just east of Lake Tahoe between the Sierra Nevada Mountains of California and the Wassuk Range of western Nevada. The program has been effective because the density bonuses allowed to projects that purchase TDRs have been sufficient to provide real incentive.

According to Pruetz²⁰, the County certified its first TDRs in December 2002, preserving 2,177 acres. On May 25, 2005, the *Douglas County Record-Courier* reported that the County was processing a TDR application that would preserve 700 acres of farmland. The County's TDR Certificate Log, dated May 5, 2005, indicates that as of that date, the County had transferred 3,293 TDRs and certified an additional 79 TDRs that were not yet transferred. These TDRs resulted in the preservation of 3,628 acres of land as of that date.

As of today, 11,505 acres of open space, most of it irrigated agricultural land in the primary floodplain of the Carson Valley, has been forever preserved. To put this in perspective, the total area of Douglas County is 472,141 acres (738 square miles), with 139,655 acres in private ownership. The 11,505 acres of land under conservation easement amounts to:

- Almost 18 square miles.
- 2.4 percent of the county's total area.
- 8.2 percent of the privately held land in the county.
- 173 percent more land than had been preserved as of 7 years ago.

8.1.1.1.2 Program 2: Montgomery County, Maryland: An Urban Model

Montgomery County, population 875,000, operates the nation's largest TDR program and has preserved more than 42,000 acres of farmland through private transactions *not requiring use of public funds* in this suburban community northwest of Washington, D.C. The program was created to compensate landowners when a large agricultural area was downzoned, and property owners were granted development rights based on their *prior* development potential.

Prior to the rezoning, development could occur on-site at a density of one unit per 5 acres. After the rezoning, density was limited to one unit per 25 acres for development on the sending site itself. Through the TDR program, the County then also allowed farmers to sell one development right per each 5 acres of deed-restricted land. For developers, purchase of a TDR allowed an increase in density from five units per acre to seven units per acre.

Because Montgomery County farmers can continue farming and maintain fee title to their land even after they sell their TDR value, the program provides income directly related to the public benefit of keeping the land undeveloped. The program was designed such that the development community had sufficient economic incentive from the additional two units per acre of development right to motivate real market activity, price discovery, and demand for conservation action by farmers.

²⁰ Pruetz, Rick, *Beyond Takings and Givings*, 2003, Arje Press

Key Object Lessons

Given the projected development pressure facing the Puget Sound region, TDRs should be able to play a significant role in achieving open space, working agriculture, greenbelt, water quality, and habitat benefits *without the use of public expenditure*.

For the promise of this approach to be fulfilled, however, it will be essential that existing TDR programs be improved and future programs be designed in such a way that a true win-win-win is delivered.

Demand. As with all markets, real activity must begin with a demand for whatever product or service is being offered. Before conservation benefits can be achieved through this mechanism, it will be essential to really engage with the development community to understand in detail what specific benefits they desire and would be willing to purchase if offered. In some instances, simply reducing the time it takes to get through a permitting process can be extremely valuable, so 'a place at the front of the line' for those purchasing TDRs is one option. This approach has been used successfully to motivate builders to adopt LEED 'green building' standards in some communities. In other cases, some combination of density, floor area ratio, or parking or other impervious surface may be required. In others, simply the right to build in a given zone could provide a simple solution. No matter what constellation of incentives is ultimately decided on, however, it will remain essential that the price for TDRs not be diluted by the availability of other options that allow developers to achieve the same benefits offered by the TDR program through other, less expensive or difficult means.

Supply. As in Montgomery County, Douglas County, or any of the other successful programs documented by Pruetz, farmers, ranchers, and other private landowners in geographic areas that can provide *the kind of environmental benefits the Partnership has articulated* will need to have sufficient motivation to voluntarily give up development value. This may well require regional cooperation and coordination between multiple City and County government units or the formation of Joint Powers Agreements to administer and monitor the implementation of a TDR program.

Public Benefit. Areas eligible to sell credits into a TDR program should be selected on the basis of the multiple benefits that conservation can provide there. In addition to water quality and habitat benefits, well designed programs will help to ensure provision of local agricultural products, reducing the overall emissions and environmental impact of regional food supply.

**Puget Sound Partnership
Action Agenda: Financing Strategy**

Estimates of Spending Related to Puget Sound

January 5, 2009



1109 First Avenue, Suite 400
Seattle, WA 98101
Phone: 206-691-0700
www.evergreenfc.com

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INTRODUCTION

In developing the Action Agenda finance strategy, Evergreen Funding consultants was asked to estimate current spending used to support environmental protection and

ecosystem restoration activities in the Puget Sound region. The goal of the analysis is to characterize and, where possible, quantify all major sources of funding used by every level of government and the private sector for habitat protection and restoration, water quality improvements, stormwater improvements, science, monitoring, and related activities.¹ Although these issue areas differ from the four Action Agenda priorities, they correspond to typical categories used by government programs and budgets. They were also used by the first Puget Sound Partnership in 2006 in a detailed analysis of the state budget, on which this current analysis heavily relies. The ten issue areas are as follows:

- Clean up contaminated sites and sediments
- Prevent toxic contamination
- Prevent harm from stormwater runoff
- Prevent nutrient and pathogen pollution
- Protect functioning habitats
- Restore degraded habitats
- Conserve and recover species at risk
- Water quantity
- Public education and involvement
- Science

Information on current spending has three major purposes in the development of the financing strategy:

- It provides a baseline that can be used to evaluate future spending on similar activities;
- It indicates the relative size and potential accessibility of various spending streams and can determine which to prioritize for further analysis and action; and
- It recognizes the substantial commitments that are already being made by many agencies and enterprises to maintain and restore Puget Sound, illustrating who is bearing how much of the load.

Spending documented in this analysis includes capital and non-capital spending that can be directly attributed to Puget Sound restoration and cleanup. This analysis constitutes an initial look at spending based on readily available, published sources.

¹ Tribes are not included in this analysis because of the difficulty of obtaining spending data.

Several caveats are necessary. First, spending does not divide easily into for-Puget-Sound and not-for-Puget Sound categories, as there are many activities, such as replacing aging vehicle fleets and improving air quality, that have significant but indirect benefits to Puget Sound quality. Rather than capturing everything that may have some benefit to the Sound, the analysis addresses priority threats identified in the Topic Forum work to concentrate on actions that have a direct benefit to the waters of Puget Sound and to the land that drains directly to these waters.

The second major caveat is that data on spending are difficult to locate and collect and, when available, tend to be inconsistent in format. In some situations (such as with spending by private business and industry on water quality compliance), a precise accounting is beyond the time and resource constraints of this analysis. In these circumstances the relative level of spending is characterized and bolstered by anecdotal data where possible. In other situations, public spending is passed through several levels of government, such as federal appropriations to the State Revolving Fund, which are then passed to local governments as loans. Pass-throughs have been eliminated, where possible, to reduce double-counting. Spending has been assigned to the original funder, that is to the providing rather than receiving entity.

The third major caveat is that the available data document spending on a mix of restoration, wastewater treatment, and mitigation activities. These three categories, however, should be considered separately. Whereas restoration improves the health of Puget Sound above the current level, wastewater treatment and mitigation prevent or reduce additional harm by human activities. In addition, spending on wastewater treatment and mitigation are typically federally mandated, whereas restoration is a more discretionary expenditure. Where possible, this analysis notes where spending is primarily on wastewater treatment or mitigation activities. Chapter 2 discusses overall spending, focusing primarily on spending on protection and restoration. Chapter 3 describes mitigation spending in more detail.

Finally, in part for the reasons stated above, this analysis is not intended to match directly the cost estimate contained in the Financing Strategy of the Action Agenda. This analysis is more comprehensive and includes spending by federal, state, and local governments as well as estimates of mitigation funding. It also includes a broader universe of activities that are not tied to specific actions in the Action Agenda, which also results in greater estimated spending. The Finance Strategy estimates also remove one-time funded projects and activities, and are based primarily upon what state agencies anticipate carrying forward into the 2009-11 Biennium.

SUMMARY OF FINDINGS

This analysis has resulted in the following overall findings on spending on Puget Sound recovery:

1. Current annual spending on Puget Sound protection and restoration is estimated to be on the order of \$564 million per year from the public sector. The public sector also spends an estimated \$799 million on wastewater treatment and \$646 million on mitigation in Puget Sound.
2. Private spending is very difficult to quantify, but mitigation activities associated with new development are likely to range from \$515 million to \$1.58 billion per year.
3. The majority of public and private spending are in the form of permit-required mitigation and wastewater treatment. Approximately 28% of public spending is on protection and restoration; overall less than one sixth of estimated public and private spending goes to this category.
4. Approximately 46% (\$259 million) of public spending on protection and restoration is provided through sources that have a high potential to be realigned (if needed) with Partnership priorities. Examples include local government spending on natural resources and the environment as well as grants through the Department of Ecology (DOE), the Recreation and Conservation Office (RCO), and the Washington Wildlife and Recreation Program (WWRP); however, some portion of these sources is likely already in alignment with overall priorities.

These findings are based in part on Table 1 and Figure 1, which describe overall spending by level of government. Information in the table and chart is based on an analysis of spending by each level of government. The methodology used to estimate these values is described in the following chapters. Note that totals have been adjusted, where possible, to limit double-counting of pass-through funding, which is accounted for at the point of initial distribution.² An estimated \$100 million of federal pass-throughs could not be removed from state and local spending. Similarly, approximately \$75 million in state pass-throughs to local governments and other entities could not be tracked and accounted for.

Note that categories in charts and tables may not sum to reported totals due to rounding.

² For example, grants are counted at the level of the granting organization rather than as they are spent by the grant recipient.

Table 1. Estimated Total Annual Public Spending on Puget Sound (in millions)³

FEDERAL GOVERNMENT	
Protection and Restoration	
Army Corps of Engineers	\$47
US Environmental Protection Agency	\$30
US Fish and Wildlife Service	\$23
Salmon Grants	\$23
Other Federal Grants	\$20
Navy Region Northwest	\$10
US Department of Agriculture Rural Development	\$3
US Geological Survey	\$7
US Forest Service	\$6
Fort Lewis	\$1
Total Protection and Restoration	\$171
Wastewater Treatment	
State Revolving Fund Grants	\$26
US Environmental Protection Agency	\$11
US Department of Agriculture Rural Development	\$6
Fort Lewis	\$1
Total Wastewater Treatment	\$43
Mitigation	
Federal Highway Mitigation	\$131
Military Compliance/Mitigation	\$96
Sound Transit Mitigation	\$15
Other Federal Mitigation	N/A
Total Mitigation	\$242
TOTAL FEDERAL SPENDING	\$456

³ Tribes are not included in this analysis because of the difficulty of obtaining spending data.

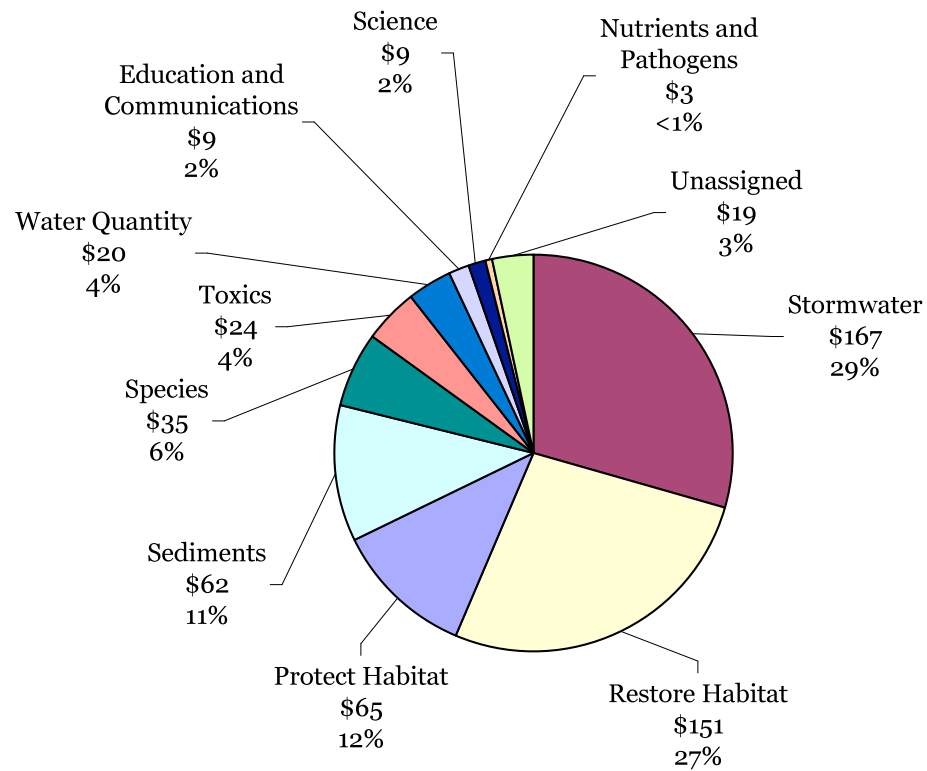
Table 1. Estimated Total Annual Public Spending on Puget Sound (in millions)³

STATE GOVERNMENT	
Protection and Restoration	
Department of Ecology (DOE) - other grants	\$26
DOE - Remedial Action Grants	\$25
Recreation and Conservation Office (RCO)	\$21
DOE - Local Gov't Stormwater Grants	\$14
Washington Wildlife and Recreation Grants (WWRP)	\$11
DOE – other direct spending	\$11
Department of Fish and Wildlife (DFW)	\$10
Puget Sound Partnership (PSP)	\$9
Public Works Assistance Account (PWAA)	\$5
Department of Natural Resources (DNR)	\$4
State Parks	\$3
Salmon Recovery Funding Board (SRFB)	\$3
Conservation Commission	\$2
Aquatic Lands Enhancement Account (ALEA)	\$2
UW/WSU	<\$1
Department of Health (DOH)	<\$1
Other spending	<\$1
Total Protection and Restoration	\$148
Wastewater Treatment	
Public Works Assistance Account	\$58
State Revolving Fund (SRF)	\$56
State Parks	\$12
Centennial Clean Water Fund (CCWF)	\$6
DOE - other direct spending	\$4
Department of Community, Trade, and Economic Development (CTED)	\$4
Department of Health	\$3
DOE - Other Grants	\$2
Total Wastewater Treatment	\$145
Mitigation	
Department of Transportation (DOT) – Mitigation	\$150
Other State Mitigation	N/A
Total Mitigation	\$150
TOTAL STATE SPENDING	\$443

Table 1. Estimated Total Annual Public Spending on Puget Sound (in millions)³

LOCAL GOVERNMENT	
Protection and Restoration	
Storm Drainage Utilities Agencies	\$127
Natural Resources/Environmental Preservation Agencies	\$112
Sewer Utilities Agencies	\$7
Total Protection and Restoration	\$246
Wastewater Treatment	
Sewer Utilities Agencies	\$611
Total Wastewater Treatment	\$611
Mitigation	
Sewer Utilities Agencies' Mitigation	\$21
Storm Drainage Utilities Agencies' Mitigation	\$5
Other Local Mitigation	\$228
Total Mitigation	\$254
TOTAL LOCAL SPENDING	\$1,111
TOTAL PROTECTION AND RESTORATION PUBLIC SPENDING	\$564
TOTAL WASTEWATER TREATMENT PUBLIC SPENDING	\$799
TOTAL MITIGATION PUBLIC SPENDING	\$646
TOTAL ANNUAL PUBLIC SPENDING	\$2,009

Figure 1. Estimated Total Annual Public Sector Spending on Puget Sound Protection and Restoration by Issue Area (in millions)⁴



⁴ Excludes spending on wastewater treatment (\$799 million) and mitigation (\$646 million). Some spending by the federal government could not be assigned to an issue area.

ESTIMATED ANNUAL SPENDING BY LEVEL OF GOVERNMENT AND THE PRIVATE SECTOR

Federal Spending

Principal Federal Roles

The federal government supports Puget Sound recovery in several important ways:

- Providing grants and loans to state and local agencies and other parties.
- Managing a diverse group of properties and facilities, including military installations, national parks and forests, and public buildings.
- Providing a variety of science, monitoring, and technical assistance services to state and local agencies.
- Managing, monitoring, and enforcing compliance with federal laws and regulations.

Significant Federal Spending Programs

Grant and Loan Programs:

The federal government distributes grants and loans in three ways: by formula to the states, by congressional appropriation to the states, and through direct competitive programs. There are dozens of grant and loan programs that focus some spending on the Puget Sound environment. Among the more significant for the Partnership's interests are:

- Formula grants to the state revolving fund, a major contributor to water quality infrastructure in the state, and to the federal highway system, a major source of environmental impacts and corresponding spending on environmental mitigation.
- Direct congressional appropriations to the Environmental Protection Agency (EPA) for Puget Sound Partnership (PSP) initiatives, to the state via the Pacific Coastal Salmon Recovery Fund (principal source for the Salmon Recovery Funding Board program), and to Sound Transit, a major contributor to mitigation spending.
- Competitive federal grants via the US Department of Agriculture (USDA) Farm Bill incentive, EPA targeted watershed, the US Fish and Wildlife Service (USFWS) cooperative endangered species fund, and numerous other grant programs.

Spending on Property and Facilities:

The federal government owns and manages about 3.5 million acres of the Puget Sound basin, with the majority of federal land in the national parks and forests of the Cascade

and Olympic Mountains.⁵ⁱ Spending on federal lands includes a wide range of expenses associated with compliance with federal and state environmental regulations and voluntary restoration and enhancement activities. These categories are of particular relevance to the Partnership:

- Direct spending by the National Park Service (NPS) and US Forest Service (USFS) to support environmental protection and restoration in the parks and forests, including spending on road decommissioning, riparian restoration, and removal of the Elwha dam.
- Spending, particularly on environmental compliance and mitigation, by managers of major federal holdings on the Puget Sound shoreline including the Kitsap Naval Base, Naval Station Everett, the Naval Submarine Base in Bangor, the Whidbey Island Naval Air Station, and Fort Lewis.
- Spending by the Federal Highway Administration (FHA) on mitigation for transportation (highway and mass transit) projects.
- Spending by the Corps of Engineers (Corps) on restoration.

Science and Technical Assistance:

Several federal agencies provide science, monitoring, and technical assistance on Puget Sound-related issues to other agencies, organizations, and the general public. Spending is significant in the following programs:

- Expenses related to technical assistance for on-farm conservation strategies provided through NRCS and the Farm Services Agency.
- Spending on Puget Sound science and monitoring by National Oceanic and Atmospheric Administration (NOAA) Fisheries, USFWS, EPA, and other agencies.

Regulatory Compliance:

The federal government is charged with enforcing a large suite of federal environmental laws and regulations that have a direct impact on Puget Sound, including the non-delegated portion of the Clean Water Act, the Endangered Species Act, and many others. Several spending programs are particularly important for the Partnership's activities:

- Spending by EPA and the Corps related to Clean Water Act compliance, including planning, monitoring, program management, and permitting.
- Spending by NOAA Fisheries, USFWS, and the Corps related to Endangered Species Act compliance and a similar suite of activities.

⁵ Includes land in WRIs 1 through 19 controlled by NPS, Bureau of Land management, Department of Defense, USFWS, USFS.

Methods for Calculating Federal Spending

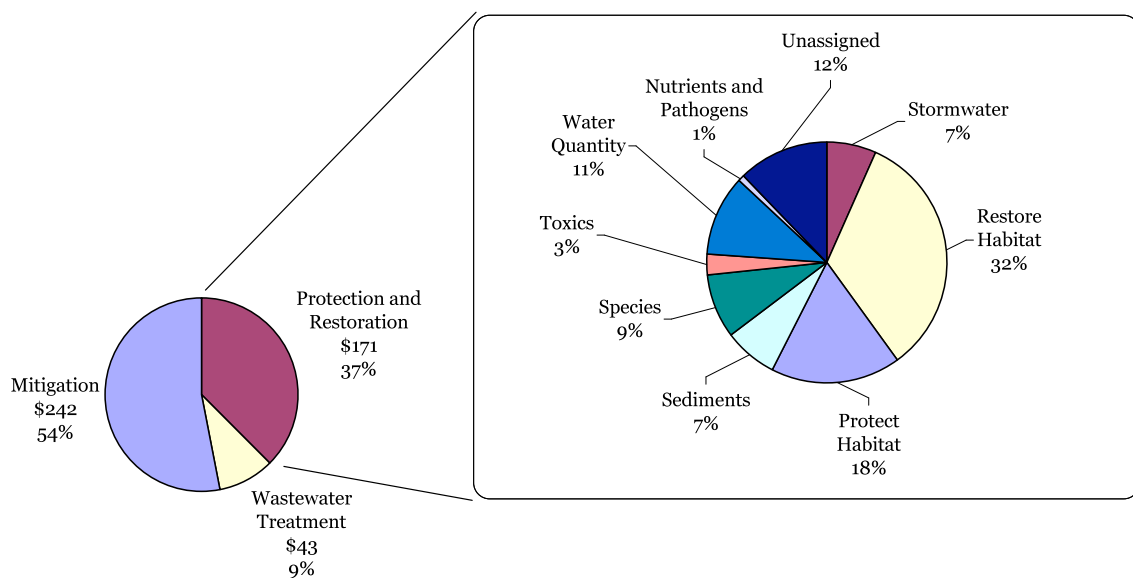
Federal spending was estimated based on information provided by federal agencies to the Puget Sound Partnership through the Puget Sound Inventory and a follow-up data request.

Findings on Federal Spending

Annual spending by the federal government on programs that are directly relevant to Puget Sound protection and restoration is estimated at \$171 million per year for activities such as regulatory compliance, technical assistance, science, and operations. Another estimated \$43 million is spent on wastewater treatment, including \$26 million through the grants to the State Revolving Fund. Approximately \$242 million is spent on mitigation for the federal highway program, Sound Transit, and capital improvements on Puget Sound military installations. Figure 2 below summarizes total estimated federal spending, categorizing protection and restoration spending into issue areas.

As discussed under significant federal spending programs, the federal government provides an estimated \$60 million in State Revolving Fund, salmon recovery, and other grants to state and local government, which have been removed from the spending estimates for those levels of government. Another \$100 million in federal pass-through spending could not be removed and may be double-counted in the overall total.

Figure 2. Estimated Annual Federal Spending (in millions) and Federal Spending on Protection and Restoration by Issue Area (as a percent of \$171 million)



State Spending

Principal State Roles

The state government supports Puget Sound recovery in several important ways:

- Organizing and managing the recovery effort at the multi-state, state, and multi-county level.
- Providing grants and loans to local governments and other parties.
- Managing a diverse group of state-owned properties and facilities.
- Providing a variety of science, monitoring and technical assistance services to local agencies and others.
- Managing, monitoring, and enforcing compliance with state laws and regulations.

Significant State Spending Programs

State Programs to Manage the Recovery Effort:

As the lead in the Puget Sound recovery effort, the state supports the administration and work of the Partnership and beneficial actions in many state agencies, including the Department of Ecology (DOE); Washington Department of Fish and Wildlife (DFW); Department of Community, Trade and Economic Development (CTED); and others.

Grant and Loan Programs:

The state government distributes most of its grant and loan funding through direct competitive programs. There are several grant and loan programs that are particularly important for the Partnership's efforts, including:

- Infrastructure loans via the Public Works Trust Fund (PWTF) and the State Clean Water Revolving Fund (SRF).
- Infrastructure and project grants through the DOE Remedial Action, Centennial Clean Water Fund (CCWF), and SRF.
- Grants for habitat protection and restoration projects via the Salmon Recovery Funding Board (SRFB), Washington Wildlife and Recreation Program (WWRP), and Aquatic Lands Enhancement Account (ALEA) programs.
- Grants to support local watershed groups such as salmon recovery lead entities and watershed planning groups.
- Grants to local governments to develop local land use plans and ordinances including Critical Area Ordinances and Shoreline Management plan updates.

Spending on Property and Facilities:

The state government owns about 950,000 acres of uplands and 2,461 miles of shoreline in the Puget Sound basin.^{6 ii} The Washington State Department of Natural Resources (DNR) manages the majority of this land, while the DFW and Washington State Parks & Recreation Commission (Parks) manage smaller holdings. In addition, the state manages the state and federal highway system. Major categories of spending of particular relevance to the Partnership include:

- Spending on preservation and management by DNR of state-designated and -owned Natural Areas and Natural Resource Conservation Areas as well as administration of Habitat Conservation Plans on state forest lands that protect rare and threatened and endangered species.
- Expenses related to management of state parks and wildlife areas under management by Parks and DFW.
- Mitigation for the environmental impacts of new construction and maintenance of the state and federal highway system.
- Capital improvements to and operations of fish hatcheries by DFW.

Science and Technical Assistance:

DOE, DNR, DFW, the Washington State Conservation Commission (CC), and the Partnership make significant expenditures related to science and technical assistance on Puget Sound-related issues. Spending is particularly substantial in the following programs:

- Technical assistance to farmers and foresters through the CC and DNR.
- Spending on Puget Sound science and monitoring by DOE, DFW, the Partnership, and other agencies.

Regulatory Compliance:

The state government has regulatory authority under a suite of state and federal laws and has significant expenses for regulatory permitting, monitoring, and enforcement. Expenses are particularly significant for the following activities:

- Spending by DFW on enforcement of hunting and fishing regulations and issuing Hydraulic Project Approvals.
- Spending by DOE on enforcement of the Shoreline Management Act and the National Pollutant Discharge Elimination System (NPDES).

⁶ Includes land in WRIAs 1 through 19 controlled by DNR, DFW, Parks, Department of Corrections, State University, and other state government.

Methods for Calculating State Spending

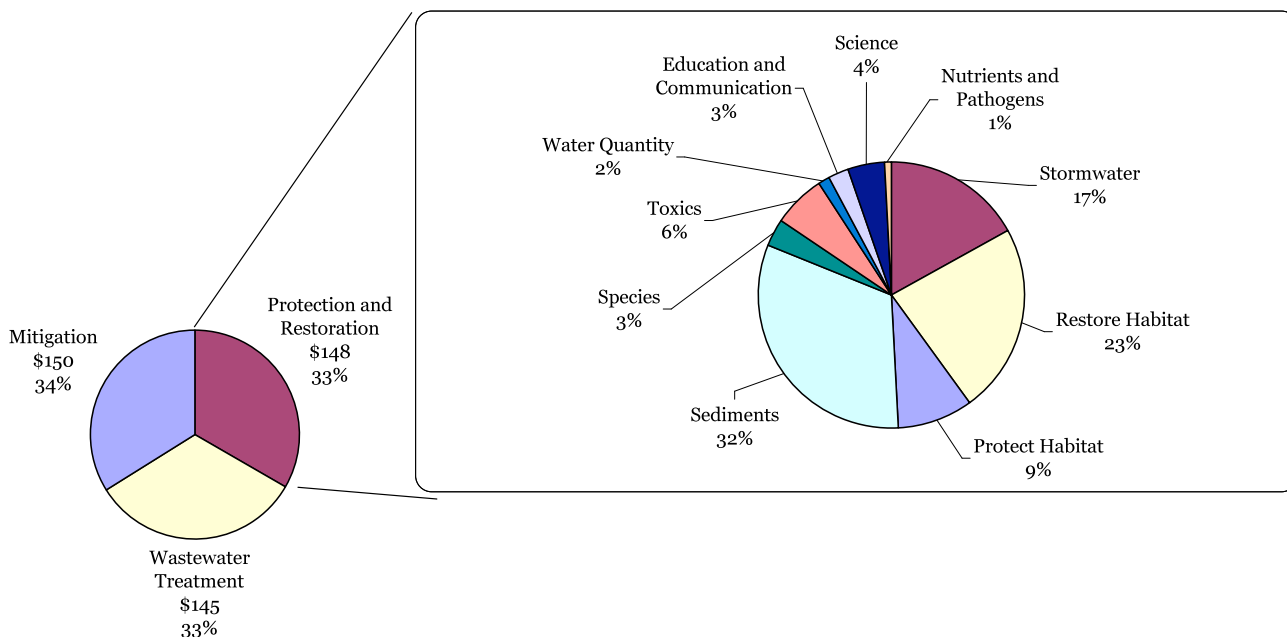
Total state spending on Puget Sound in the 2007-09 budget cycle was estimated based on previous budget analyses conducted by the Office of Financial Management. A Government Management Accountability and Performance (GMAP) analysis on the 2005-07 budget was updated with new appropriations added in the 2007-09 budget.ⁱⁱⁱ

Note that the estimated annual state spending extrapolated from these sources is not precise and should be considered an order-of-magnitude estimate rather than an exact figure. Although \$55 million in pass-throughs from the federal government have been removed from estimated state spending, not all pass-throughs could be identified and accounted for.

Findings on State Spending

Annual spending by the state government on programs for Puget Sound protection and restoration is estimated at \$148 million per year. The state spends another \$145 million on wastewater treatment, primarily in the form of grants and loans provided through the State Revolving Fund and Public Works Assistance Account. As discussed later in chapter 3, the Department of Transportation spends an estimated \$150 million on mitigation in Puget Sound. Figure 3 below summarizes total estimated state spending, categorizing protection and restoration spending into issue areas.

Figure 3. Estimated Annual State Spending (in millions) and State Spending on Protection and Restoration by Issue Area (as a percent of \$148 million)



Overall, more than half of state spending on protection is passed through to other entities through grants (62%) and loans (3%), while 35% is spent directly by state agencies as shown in Figure 4. Approximately \$18 million in grants and loans went to local governments for stormwater, while another \$3 million was provided for reclaimed water grants. The remaining \$75 million in state pass-throughs could not be assigned to

individual entities or issue areas. Figure 5, below, presents state spending on protection and restoration by agency and program.

Figure 4. Estimated State Spending on Protection and by Grants, Loans, and Direct Spending (in millions)

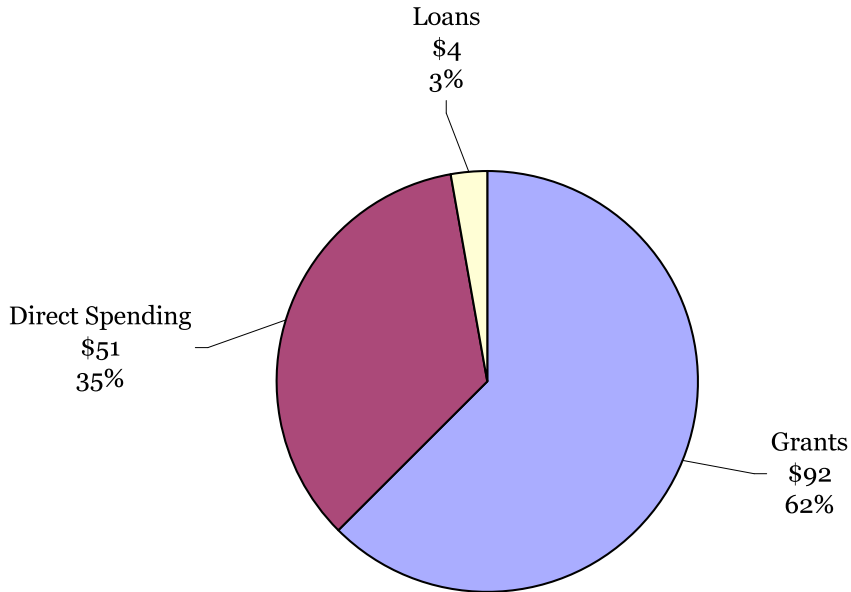
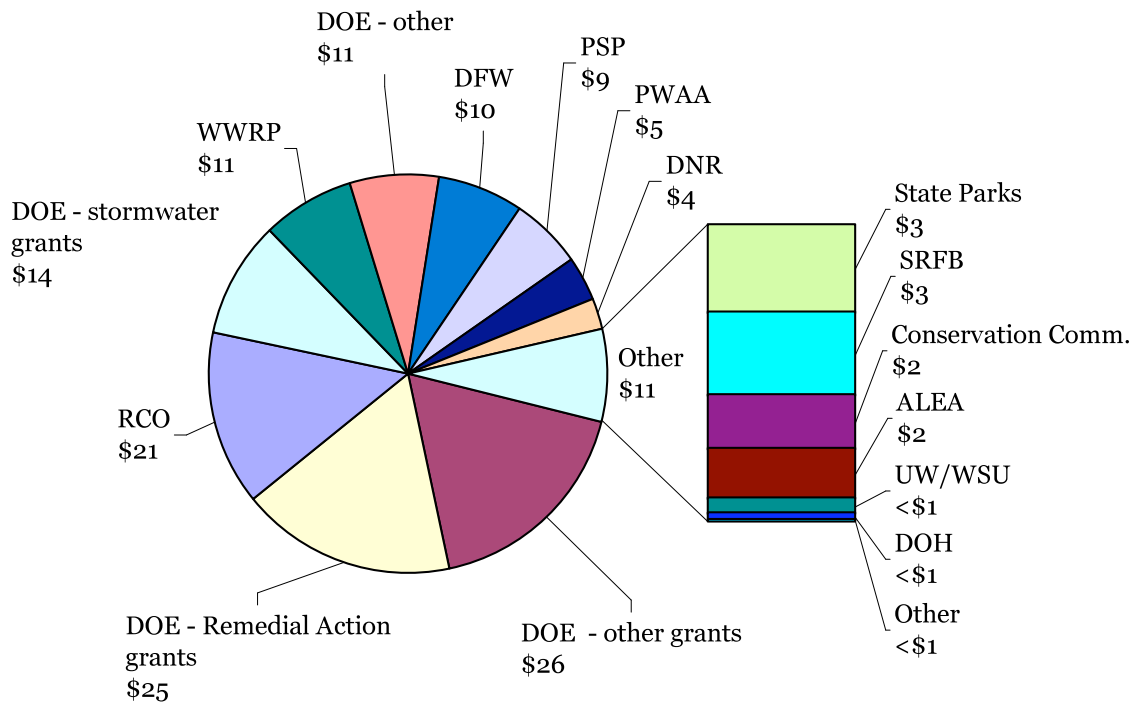


Figure 5. Estimated Annual State Spending on Protection and Restoration by Agency/Program (in millions)



Local Government Spending

Principal Local Government Roles

Local governments support Puget Sound recovery in several important ways:

- Implementing recovery actions at the watershed and local government level.
- Providing grants and loans to landowners, community organizations, and other parties.
- Managing a diverse group of local government-owned properties and facilities, including water, wastewater, and stormwater infrastructure.
- Providing a variety of science, monitoring, and technical assistance services to landowners, watershed organizations, and others.
- Managing, monitoring, and enforcing compliance with local laws and regulations.
- Outreach and education to landowners and businesses.

Significant Local Government Spending Programs

Watershed and Local Programs to Support the Recovery Effort:

Most of the watershed lead entities and similar organizations are staffed and managed (in full or partially) with local government staff and officials. Much of their operational funding comes from state agencies. Funding responsibilities include:

- Managing the local and watershed component of the salmon recovery effort and the SRFB grant process.
- Managing watershed engagement in HB 2514 water quantity management programs.
- Managing and staffing most Total Maximum Daily Load water quality improvement programs.

Spending on Property and Facilities:

Local governments own and manage approximately 170,000 acres in the region, including an extensive system of water, wastewater, stormwater, and flood control facilities.^{7iv} The following categories of spending are particularly significant:

- Capital improvements to regional wastewater treatment and water supply systems, particularly retrofits of combined sewer systems and installation of new capacity.
- Operations of local and regional water, stormwater, and wastewater utilities.

⁷ Includes land in WRIAs 1 through 19 controlled by cities and counties.

- Improvements to stormwater facilities to meet NPDES requirements.

Science and Technical Assistance:

Several of the larger local governments, most notably Seattle and King County, have significant scientific expertise on staff and share this expertise with agencies within their government and with other governments and organizations. In addition, local conservation districts and special purpose districts provide technical assistance to landowners on conservation topics.

Regulatory Compliance:

Local governments implement local laws and regulations. Of particular importance to the Partnership are expenses related to implementation of the Growth Management Act (particularly critical area provisions), related local clearing and grading ordinances, and the Shoreline Management Act.

Methods for Calculating Local Government Spending

The Washington State Auditor requires local governments to report revenue and expenditure data annually as part of its Local Government Financial Reporting System (LGFRS). Although the LGFRS does not include a category devoted to spending on Puget Sound, the database does include several categories of spending that clearly relate to water quality and habitat activities. In particular, the LGFRS reports spending by all cities and counties on:

- Sewer utilities, which manage and treat wastewater and keep nutrients, pathogens, and toxins out of Puget Sound.
- Storm drainage utilities, which manage stormwater flows into Puget Sound.
- Natural resources spending, which include programs on pollution control, invasive species control, soil conservation, and other programs that benefit Puget Sound.

We acquired data from the LGFRS for all twelve counties that border Puget Sound and all cities within those counties. The LGFRS database includes spending on operating costs, capital expenditures, and debt payments on an annual basis. Operating costs and capital expenditures were included in this analysis, but debt was excluded. Debt spending is assumed to pay for projects that were counted as capital expenditures in past years.

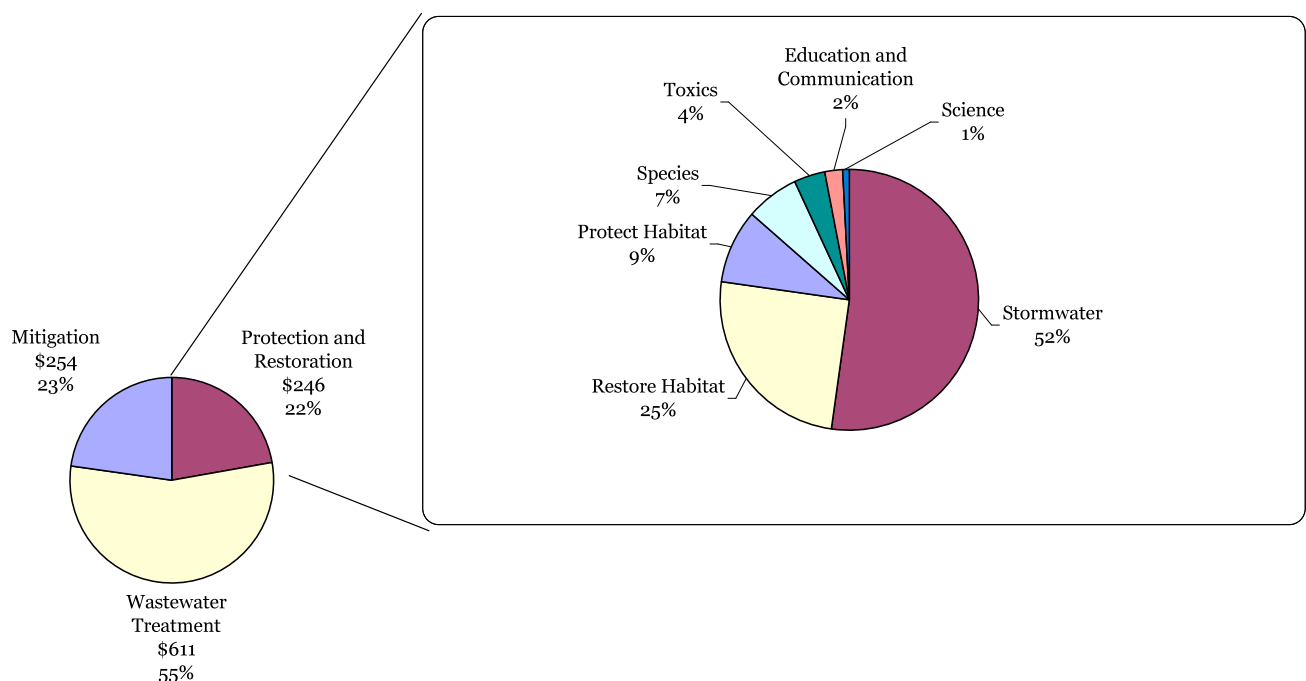
Note that several other spending categories also likely include activities that benefit Puget Sound, such as Parks and Recreation, Water Utilities, Engineering, and Community Development. However, given the difficulty associated with identifying what fraction of these expenditures benefit the Sound, they have been excluded from this analysis.

Spending totals exclude an estimated \$176 million in pass-throughs from the federal and state governments, including \$155 million in wastewater spending and \$21 million in protection and restoration spending. However, not all pass-throughs from the federal and state governments could be identified and accounted for.

Findings on Local Government Spending

Annual spending by local governments in Puget Sound on protection and restoration is estimated at \$246 million per year. Local governments spend another \$611 million on wastewater treatment through sewer utilities. As discussed later in chapter 3, Puget Sound local governments spend an estimated \$254 million on mitigation. Figure 3 below summarizes total estimated state spending, categorizing protection and restoration spending into issue areas. These expenditures represent approximately 10% of the \$10.6 billion total annual expenditures by cities and counties in the twelve-county region. King County and its cities account for the majority of spending by local governments.

Figure 6. Estimated Annual Local Spending (in millions) and Local Spending on Protection and Restoration by Issue Area (as a percent of \$246 million)



The table below provides further detail into the expenditures by category. All spending was calculated by assigning specific expenditures in the State Auditor's Local Government Financial Reporting System (LGFRS) to the spending categories listed. Please note that in cases where no clear one-to-one match existed between the LGFRS and the spending category (e.g., "Science"), the most closely fitting category was assigned.

Table 2. Estimated Distribution of Puget Sound Spending by Local Governments

Category	LGFRS Spending Categories Included
Nutrients and Pathogens (I)	Sewer Utilities
Stormwater (I)	Storm Drainage Utilities
Restore Habitat (I)	Most Natural Resources expenses
Protect Habitat (I)	An estimated fraction of Natural Resources expenses
Species (I)	An estimated fraction of Sewer, Storm Drainage, Natural Resources, and habitat restoration expenses
Toxics (I)	Pollution Control spending in Natural Resource Spending
Education and Communications (I)	An estimated fraction of Sewer, Storm Drainage, and Natural Resources expenses
Science (I)	An estimated fraction of Natural Resources expenses

ESTIMATED PRIVATE SECTOR SPENDING

Reliable data on private sector spending in Puget Sound are not available. This section describes the types of activities undertaken by the private sector, estimates of spending on those activities, and the methodology used to produce those estimates.

Principal Private Sector Roles

The private sector supports Puget Sound recovery in several important ways:

- Complying with federal, state, and local environmental laws and regulations.
- Mitigating unavoidable environmental impacts through on-site restoration projects or contributions to mitigation banks.
- Paying permit, wastewater, and other fees to state and local governments, which support a wide range of Sound-focused capital and operating expenses.
- Undertaking voluntary environmental improvement projects.

Significant Private Sector Spending Programs

Spending on Routine Environmental Compliance:

Private industry and businesses face numerous expenses associated with periodic re-permitting of their activities.^v Most notable are:

- Costs of monitoring and reporting on permit compliance.
- Spending on capital and process upgrades to comply with evolving permit requirements.

The National Pollutant Discharge Elimination System (NPDES) permitting process accounts for the most significant compliance related spending from the private sector in

Puget Sound. NPDES requires that everyone who discharges into a body of water get a discharge permit. The permit itself can be costly, but fulfilling the requirements of the permit is what ultimately contributes most to the spending stream. The permit describes what the discharger must do to protect the water, what types of monitoring and reporting the discharger must perform, and the limits on pollutants that can be discharged. Most commercial dischargers in the Puget Sound are eligible for a NPDES general permit that is specific to their industry. NPDES general permits are required for many different commercially operating institutions including boat yards, hatcheries, fruit packers, water treatment plants, large scale landscaping, and most construction work. There are currently about 5,200 NPDES permit holders in Washington State.^{vi}

The cost to the industrial sector to comply with the requirements of the NPDES general permits is unknown and presumably varies between industries. There have been no studies evaluating the cost of this permit process to the private sector, but we can assume that it is a significant spending stream.

Spending on Utility Fees and Charges:

Homeowners, businesses, and industries pay fees for sewage, water, and stormwater services that support the capital and operating costs of local and regional utilities.

In 2006 an average single-family household in King County paid \$70.87 per month for the following utilities: sewage (\$35.15), water (\$24.38), and stormwater (\$11.34). Rates vary among counties and in most cases directly fund local utilities. For example, wastewater capital and operating expenditures in King County totaled about \$300 million, while households generated \$289,275,480 through rate-paying last year.^{vii}

Because utility fees and charges are generally redistributed by local governments and special districts, and are therefore included in the local spending analysis, it was determined that a thorough analysis of private spending on utilities was unnecessary.

In addition, some homeowner, businesses, and industries pay fees to special districts for additional services, including protection of shellfish beds, restoration of lakes, aquifer protection, and flood protection.^{viii}

Spending on Voluntary Environmental Improvements:

In line with growing public interest in greening of facilities and processes, many businesses and industries are undertaking voluntary environmental improvements such as LEED or Salmon-Safe certification.

NON-PROFIT FOUNDATIONS

The Puget Sound area has many local foundations committed to providing grants to fund projects that protect and restore the environment. A survey of large awards granted by environmental foundations showed that over \$15 million was spent on projects benefiting the Puget Sound in 2007.

Table 2. Funding by Non-profit Foundations in 2007

Major Local Foundations	Puget Sound-Specific Awards (2007)
Bullitt Foundation	\$5,162,000
National Fish and Wildlife Foundation	\$4,500,000
Russell Family Foundation	\$3,895,000
NW Area Foundation	\$1,000,000
Kongsgaard-Goldman Foundation	\$650,000
Compton Foundation	\$75,000
Total	\$15,282,000

CURRENT SPENDING SOURCES AND LEVELS OF MITIGATION

This section of the report addresses spending on environmental mitigation in the Puget Sound region. Spending on mitigation is fundamentally different from spending on protection and restoration and deserves special treatment.

Mitigation is required under a group of federal, state, and local environmental regulations. Although each differs somewhat in requirements, these regulations commonly establish a baseline requirement that new development will cause no appreciable degradation in the amount and quality of regulated natural resources. This is most clearly stated in the “no net loss” standard that applies to federal regulation of wetlands. Another common feature is that applicants need to demonstrate that impacts are avoided and minimized before compensation is triggered, a stepwise process commonly known as sequencing.

Mitigation requirements apply to public sector and private development projects and are typically applied through the permitting process and executed at the time of site development. Meeting mitigation requirements is a considerable expense to public agencies, with spending estimated at \$646 million per year in the Puget Sound region.

The most fundamental difference between mitigation spending and spending on protection and restoration is that the intent of mitigation is to compensate for damages related to development, with an ultimate goal of achieving conditions that are no worse than prior to the development activity, while spending on protection and restoration focuses on a net benefit to the resource.

Some stakeholders argue that mitigation spending should not be considered in this spending analysis because it does not contribute to improvement in the resources of the region. Studies on mitigation performance, some conducted in Washington State, indicate that mitigation often fails to meet the break-even standard and that some

degradation occurs in the majority of cases. This combination of high spending levels and low performance justifies considering mitigation in this analysis as a prime opportunity to spend existing funds more efficiently and effectively on Puget Sound. Several approaches are in development elsewhere in the United States, including various banking and trading strategies, and should be considered further in the Puget Sound region.

A special caveat about mitigation spending is necessary: spending on mitigation is rarely tracked, even by public agencies, and must be estimated based on total capital funding and the likely portion devoted to mitigation activities. Several studies and unpublished sources indicate that the percentage of capital spending devoted to mitigation ranges from 5% to 20%. For the most part, the analysis in this report uses 15%.

This analysis covers mitigation spending associated with federally-funded transportation and military capital projects, state-funded transportation-related projects, locally-funded capital projects, and private sector mitigation spending on new development. A complete analysis of federal and state mitigation spending as a percentage of total capital expenditures is not available at this time.

Federal Mitigation Spending

Mitigation spending on transportation projects by the Federal Highway Administration, capital projects by the military, and federal grant-funded project by Sound Transit were estimated as 15% of capital spending listed in appropriation bills.

State Mitigation Spending

The Washington State Department of Transportation (WSDOT) is responsible for mitigating the unavoidable costs of developing roads and highways around the state.

Mitigation spending by WSDOT was estimated as 15% of WSDOT capital expenditures based on two WSDOT studies in 2003 and 2006.^{ix} Mitigation spending is assumed to be triggered by permit activities on new projects. In 2007-2009, the annualized WSDOT budget for Puget Sound projects in the Highway Improvement Program was \$147 million.^x Based on the WSDOT mitigation cost studies, mitigation spending was assigned to the issue areas in the following ratios: stormwater – 60%, restore degraded habitat – 32%, and protect functioning habitats – 8%.

Local Mitigation Spending

Local mitigation spending was estimated as 15% of annual capital spending by the 12 Puget Sound counties as reported to the Washington State Auditor as part of its Local Government Financial Reporting System (LGFRS).

New Development Mitigation Spending

A wide range of federal, state, and local environmental regulations are triggered in permitting of new development in the Puget Sound basin. These costs are borne by the development community and ultimately by consumers. Several categories of spending are particularly relevant to this analysis:

- Spending on fees and expenses related to securing environmental permits, including the costs of project delays associated with permitting.

- Spending on mitigation measures to compensate for unavoidable environmental impacts of the development activity (either on-site or via banks or other off-site alternatives).
- Spending on compliance monitoring.

Mitigation spending was calculated by applying a mitigation percentage to the total value of new construction in the Puget Sound. The total value of new construction is roughly equivalent to the total value of taxable retail sales in construction of buildings in 2007. Puget Sound counties retail sales figures totaled \$10.3 billion in 2007 according to the Washington State Department of Revenue.

A second figure also considered was the increased property value from new construction and improvements—which was approximately \$15.4 billion in 2007. The increased property value figure from county assessors includes land segregation activities that may increase property values but do not necessarily involve construction. The second figure was not used because it overestimates construction spending with environmental impacts, but was useful because it served as a total new development spending ceiling. Taxable retail sales in the construction of new buildings is likely to more precisely capture the total value of new development and therefore was used in this calculation.

Estimates of the percentage of construction spending dedicated to mitigation range from 5% to 15% of the cost of new development. Puget Sound private mitigation spending on new development, when applied to the \$10.3 billion figure, is between \$515 million and \$1.58 billion.

POTENTIAL FOR REALIGNMENT

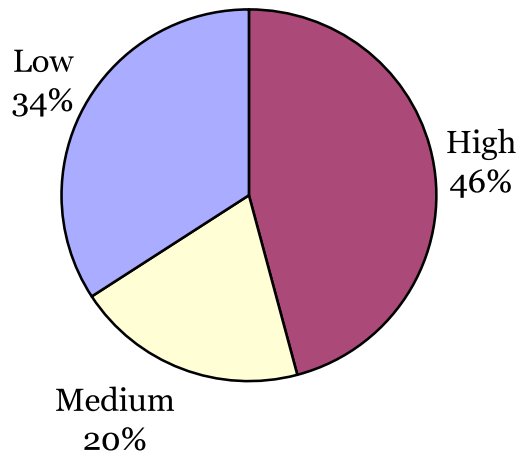
Realignment potential is a measure of the potential to better align existing funding sources with the Partnership's priorities. This analysis categorizes federal, state, and local spending on protection and restoration into three categories (high, medium, low) according to how easily they could be realigned within the existing constraints of the funding source to focus on Puget Sound needs. Some accounts are required by statutory authority to be spent on specific activities.

Sources with high potential have few constraints on realignment and will be most readily available. These include general funds and programs, accounts with broad mandates, and grants whose authorities do not give them significant constraints. Medium potential indicates sources that are restricted by fund source to a given emphasis but which may be reallocated among projects in the area of emphasis. For example, spending on Remedial Action Grants and grants from the RCO could be realigned to focus on public works projects that benefit Puget Sound. Agencies are generally assigned to the medium potential category with the assumption that their funds are more easily redirected than others. Sources with low potential, such as the Army Corps of Engineers and local military bases, will be difficult to realign due to substantial restrictions in the fund source. Note that spending in all categories may already be aligned with Partnership priorities. Figure 6 presents the estimated percentages of current public spending on protection and restoration that have high, medium, and low potential accessibility.

As currently structured, mitigation spending (not included in Figure 6) has a low potential for realignment because it must directly address the harm caused by specific

projects; however, Ecology's efforts in the Mitigation that Works forum may increase flexibility in this funding source. Similarly, spending on wastewater treatment (also not included in Figure 6) has a low potential for realignment, but a water quality trading system could increase flexibility.

Figure 6. Potential Accessibility of Current Public Sector Spending on Protection and Restoration (as a percent of \$564 million)



ACRONYMS AND ENDNOTES

Acronym / Abbreviation	Full Term
ALEA	Aquatic Lands Enhancement Account
CC	Washington State Conservation Commission
CCWF	Centennial Clean Water Fund
CTED	Department of Community, Trade and Economic Development
DFW	Washington State Department of Fish and Wildlife
DNR	Washington State Department of Natural Resources
DOE	Washington State Department of Ecology
DOH	Washington State Department of Health
DOT	Washington State Department of Transportation
EPA	United States Environmental Protection Agency
FHA	Federal Highway Administration
LFGERS	Local Government Financial Reporting System
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
Parks	Washington State Parks & Recreation Commission
PSP	Puget Sound Partnership
PWTF	Public Works Trust Fund
RA Grants	Remedial Action Grants
RCO	Washington State Recreation and Conservation Office
SRF	State Revolving Fund
SRFB	Salmon Recovery Funding Board
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
UW/WSU	University of Washington / Washington State University
WWRP	Washington Wildlife and Recreation Program

Endnotes

ⁱ WA Department of Ecology, “Washington State Major Public Lands Acreages,” (<http://www.ecy.wa.gov/services/gis/maps/wria/mpl/mplacreage.htm>).

ⁱⁱ WA Department of Ecology, “Washington State Major Public Lands Acreages,” (<http://www.ecy.wa.gov/services/gis/maps/wria/mpl/mplacreage.htm>)

ⁱⁱⁱ Budget analyses provided to the consultant by Jim Cahill, Director of Accountability and Budget, Puget Sound Partnership in May 2008. Spending by DOT from Legislative Evaluation

and Accountability Program, 2008 Transportation LEAP documents (<http://leap.leg.wa.gov/leap/budget/leapdocs/transpodocs.asp>).

iv WA Department of Ecology, “Washington State Major Public Lands Acreages,” (<http://www.ecy.wa.gov/services/gis/maps/wria/mpl/mplacreage.htm>).

v For a discussion, see “A New Measure of the Local Regulatory Environment for Housing Markets: The Wharton Residential Land Use Regulatory Index” (March, 2007). Joseph Gyourko.

vi Washington State Department of Ecology, Water Quality Division

vii Natural Resources and Parks, Wastewater Division.

viii Natural Resources and Parks, Wastewater Division.

ix Washington State Department of Transportation, “WSDOT Project Mitigation Costs Case Studies,” 2003 and 2006 available at <http://www.wsdot.wa.gov/projects/mitigation/default.htm>.

x Legislative Evaluation and Accountability Program, 2008 Transportation LEAP documents (<http://leap.leg.wa.gov/leap/budget/leapdocs/transpodocs.asp>)